ORDER NO. MTNC000842C1
B5

Service Manual

Color Television

Main Manual
(MJ4M)

Panasonic

Models	Chassis
CT-27SX10B	**AP352**
CT-27SX10CB	**AP352**
CT-F2910XB	**XP352**

This Service manual is issued as a service guide for the models of the **MJ4M** family listed above. Included in this manual are a set of schematic, block diagrams, functional descriptions, alignment procedures, disassembly procedures, and a complete parts list.

"**WARNING!** This Service Manual is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. **Products powered by electricity should be serviced or repaired only by experienced professional technicians.** Any attempt to service or repair the product or products dealt with in this Service Manual by anyone else could result in serious injury or death."

The service technician is required to read and follow the "**Safety Precautions**" and "**Important Safety Notice**" in this Main Manual.

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Important Safety Notice

Special components are used in this television set which are important for safety. These parts are identified on the schematic diagram by the symbol ⚠ and printed in **BOLD TYPE** on the replacement part list. It is essential that these critical parts are replaced with the manufacturer's specified replacement part to prevent X-ray radiation, shock, fire or other hazards. Do not modify the original design without the manufacturer's permission.

Safety Precautions

General Guidelines

An **Isolation Transformer** should always be used during the servicing of a receiver whose chassis is not isolated from AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect the Receiver from being damaged by accidental shorting that may occur during servicing.

When servicing, observe the original lead dress, especially in the high voltage circuit. Replace all damaged parts (also parts that show signs of overheating.)

Always Replace Protective Devices, such as fishpaper, isolation resistors and capacitors, and shields after servicing the Receiver. Use only manufacturer's recommended rating for fuses, circuits breakers, etc.

High potentials are present when this Receiver is operating. Operation of the Receiver without the rear cover introduces danger for electrical shock. Servicing should not be performed by anyone who is not thoroughly familiar with the necessary precautions when servicing high-voltage equipment.

Extreme care should be practiced when **Handling the Picture Tube**. Rough handling may cause it to implode due to atmospheric pressure. (14.7 lbs per sq. in.). Do not nick or scratch the glass or subject it to any undue pressure. When handling, use safety goggles and heavy gloves for protection. **Discharge the picture tube** by shorting the anode to chassis ground (not to the cabinet or to other mounting hardware). When discharging connect cold ground (i.e. dag ground lead) to the anode with a well insulated wire or use a grounding probe.

Avoid prolonged exposure at close range to unshielded areas of the picture tube to prevent exposure to X-ray radiation.

The **Test Picture Tube** used for servicing the chassis at the bench should incorporate safety glass and magnetic shielding. The safety glass provide shielding for the tube viewing area against X-ray radiation as well as implosion. The magnetic shield limits the X-ray radiation around the bell of the picture tube in addition to the restricting magnetic effects. When using a picture tube test jig for service, ensure that the jig is capable of handling **50.0kV** without causing X-ray radiation.

Before returning a serviced receiver to the owner, the service technician must thoroughly test the unit to ensure that is completely safe to operate. **Do not use a line isolation transformer when testing.**

Leakage Current Cold Check

Unplug the AC cord and connect a jumper between the two plug prongs.

Measure the resistance between the jumpered AC plug and expose metallic parts such as screwheads, antenna terminals, control shafts, etc. If the exposed metallic part has a return path to the chassis, the reading should be between 240kΩ and 5.2MΩ. If the exposed metallic part does not have a return path to the chassis, the reading should be infinite.

Leakage Current Hot Check (Fig. 1)

Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during the check.

Connect a 1.5kΩ 10 watt resistor in parallel with a 0.15μF capacitor between an exposed metallic part and ground. Use earth ground, for example a water pipe.

Using a DVM with a 1000 ohms/volt sensitivity or higher, measure the AC potential across the resistor.

Repeat the procedure and measure the voltage present with all other exposed metallic parts.

Verify that any potential does not exceed 0.75 volt RMS. A leakage current tester (such a Simpson Model 229, Sencore Model PR57 or equivalent) may be used in the above procedure, in which case any current measure must not exceed 1/2 milliamp. If any measurement is out of the specified limits, there is a possibility of a shock hazard and the Receiver must be repaired and rechecked before it is returned to the customer.

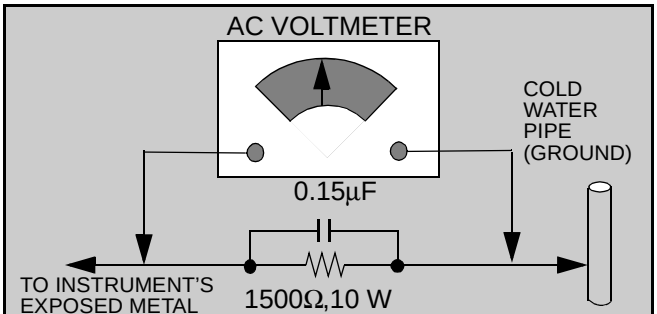

Figure 1. **Hot Check Circuit**

X-ray Radiation

WARNING: The potential source of X-ray radiation in the TV set is in the High Voltage section and the picture tube.

Note: *It is important to use an accurate, calibrated high voltage meter.*

Set the **brightness, picture, sharpness** and **color** controls to Minimum.

Measure the High Voltage. The high voltage should be **30.55kV ± 1.25kV**. If the upper limit is out of tolerance, immediate service and correction is required to insure safe operation and to prevent the possibility of premature component failure.

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Service Notes

Note: These components are affixed with glue. Be careful not to break or damage any foil under the component or at the pins of the ICs when removing. Usually applying heat to the component for a short time while twisting with tweezers will break the component loose.

Leadless Chip Component (surface mount)

Chip components must be replaced with identical chips due to critical foil track spacing. There are no holes in the board to mount standard transistors or diodes. Some chips capacitor or resistor board solder pads may have holes through the board, however the hole diameter limits standard resistor replacement to 1/8 watt. Standard capacitor may also be limited for the same reason. It is recommended that identical components be used.

Chip resistor have a three digit numerical resistance code - 1st and 2nd significant digits and a multiplier. Example: 162 = 1600 or 1.6kΩ resistor, 0 = 0Ω (jumper).

Chip capacitors generally do not have the value indicated on the capacitor. The color of the component indicates the general range of the capacitance.

Chip transistors are identified by a two letter code. The first letter indicates the type and the second letter, the grade of transistor.

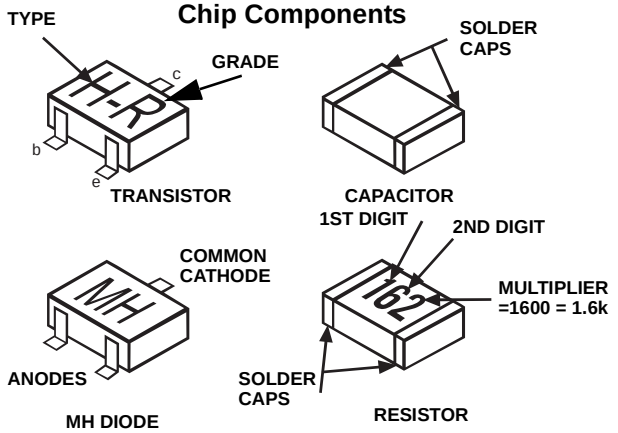
Chip diodes have a two letter identification code as per the code chart and are a dual diode pack with either common anode or common cathode. Check the parts list for correct diode number.

Component Removal

1. Use solder wick to remove solder from component end caps or terminal.
2. Without pulling up, carefully twist the component with tweezers to break the adhesive.
3. Do not reuse removed leadless or chip components since they are subject to stress fracture during removal.

Chip Component Installation

1. Put a small amount of solder on the board soldering pads.
2. Hold the chip component against the soldering pads with tweezers or with a miniature alligator clip and apply heat to the pad area with a 30 watt iron until solder flows. Do not apply heat for more than 3 seconds.

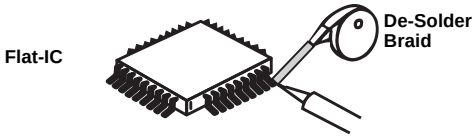


How to Replace Flat-IC

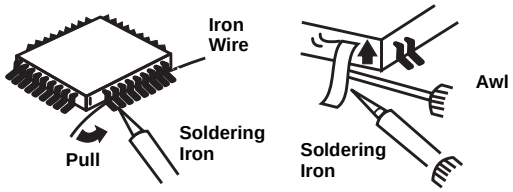
- Required Tools -

- Soldering iron
- De-solder braids
- Iron wire or small awl
- Magnifier

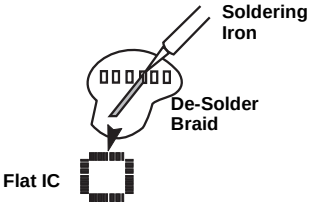
1. Remove the solder from all of the pins of a Flat-IC by using a de-solder braid.



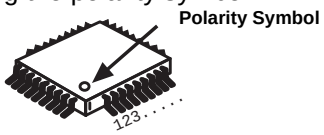
2. Put the iron wire under the pins of the Flat-IC and pull it in the direction indicated while heating the pins using a soldering iron. A small awl can be used instead of the iron wire.



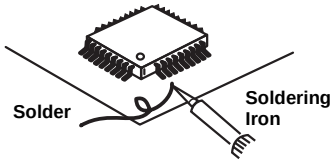
3. Remove the solder from all the pads of the Flat-IC by using a de-solder braid.



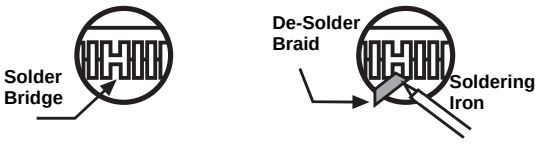
4. Position the new Flat-IC in place (apply the pins of the Flat-IC to the soldering pads where the pins need to be soldered). Properly determine the positions of the soldering pads and pins by correctly aligning the polarity symbol.



5. Solder all pins to the soldering pads using a fine tipped soldering iron.



6. Check with a magnifier for solder bridge between the pins or for dry joint between pins and soldering pads. To remove a solder bridge, use a de-solder braid as shown in the figure below.



Service Notes (Continued)

IMPORTANT: To protect against possible damage to the solid state devices due to arcing or static discharge, make certain that all ground wires and CTR DAG wire are securely connected.

CAUTION:

The power supply circuit is above earth ground and the chassis cannot be polarized. Use an isolation transformer when servicing the Receiver to avoid damage to the test equipment or to the chassis. Connect the test equipment to the proper ground (Hot ⏚) or (Cold ⏚) when servicing, or incorrect voltages will be measured.

WARNING:

This Receiver has been designed to meet or exceed applicable safety and X-ray radiation protection as specified by government agencies and independent testing laboratories.

To maintain original product safety design standards relative to X-ray radiation and shock and fire hazard, parts indicated with the symbol ⚠ on the schematic must be replaced with identical parts. Order parts from the manufacturer's parts center using the parts numbers shown in this service manual, or provide the chassis number and the part reference number.

For optimum performance and reliability, all other parts should be replaced with components of identical specification.

X-RAY PROTECTION CIRCUIT TEST

Preparation

1. Connect a High voltage meter (Capable of handle 50kV) to the CRT anode
2. Connect a variable resistor (3K) in series with a 100 ohms resistor, across (in parallel) R849.
3. Connect a jumper in R850 position (make a short on R850).

Procedure:

1. Apply a monoscope pattern.
2. Set PICTURE and BRIGHTNESS to normal.
3. Set variable resistor to maximum level (3k)
4. Plug receiver to120V ac. and turn it on.
5. Slowly decrease variable resistor value.
6. Adjust beam current to 100μA with the SCREEN VR of FBT.
7. Adjusting the Variable Resistor, check if the set starts to loose synchrony
8. Confirm the reading from the High Voltage meter is 38KV.
9. Turn Off the receiver and remove the jumper.

Receiver Feature Table

FEATURE\MODEL	CT-27SX10B & CT-27SX10CB	CT-F2910XB
Chassis	MJ4M	
# of channels	181	
Menu language	ENG/ESP/FR	
Closed Caption	X	
V-Chip (USA/CANADA)	X	
RF Input	X	
Remote Model #	EUR511502	
Picture tube	M68LQK125X	
Flat	(4:3)	
Comb Filter	3 Dig	
VM	X	
Color Temp	X	
V/A norm (X=both)	X	
MTS/SAP/DBX	X	
Built-in audio power	7W/CH(10%)	
# of speakers	2	
Speaker Type	Open Dome	
Bass/Bl/Tre Control	X	
AI Sound	X	
Surround	X	
A/V in (rear/front)	3(2/1)	
Component Input	1	
Audio Out (FAO,VAO)	F,V	
S-VHS Input (rear/front)	2(1/1)	
EPJ/HPJ/MISC	HPJ	
Dimensions mm (HxWxD) in	582x688x498.7 22.91x27.08x19.63	
Weight (kg/lbs)	40.9/90.14	
Power source (V/Hz)	120/60	
Anode voltage	30.55kV±1.25kV	
Video input jack	1 V_{p-p} 75Ω phono jack	
Audio input jack	500mV RMS 47kΩ	

Table 1. **Receiver Features**

Specifications are subject to change without notice or obligation.
Dimensions and weights are approximate.

Board Designation

Board	Part No.	CT-27SX10B & CT-27SX10CB	CT-F2910XB	Description
A-Board	TNP2AH022	AA*	AD*	Main Chassis
C-Board	TNP2AA068	AA*		CRT Drive
G-Board	TNP2AA071	AA*		Audio Circuit
H-Board	TNP2AA070	AA*		A/V Input Switch
Q-Board	TNP2AA067	AA*		H-Drive

***IMPORTANT**

When ordering boards, please add an “S” to the part number, for example TNP2AH022AA should be ordered as TNP2AH022AAS.

Location of Controls (Receiver)

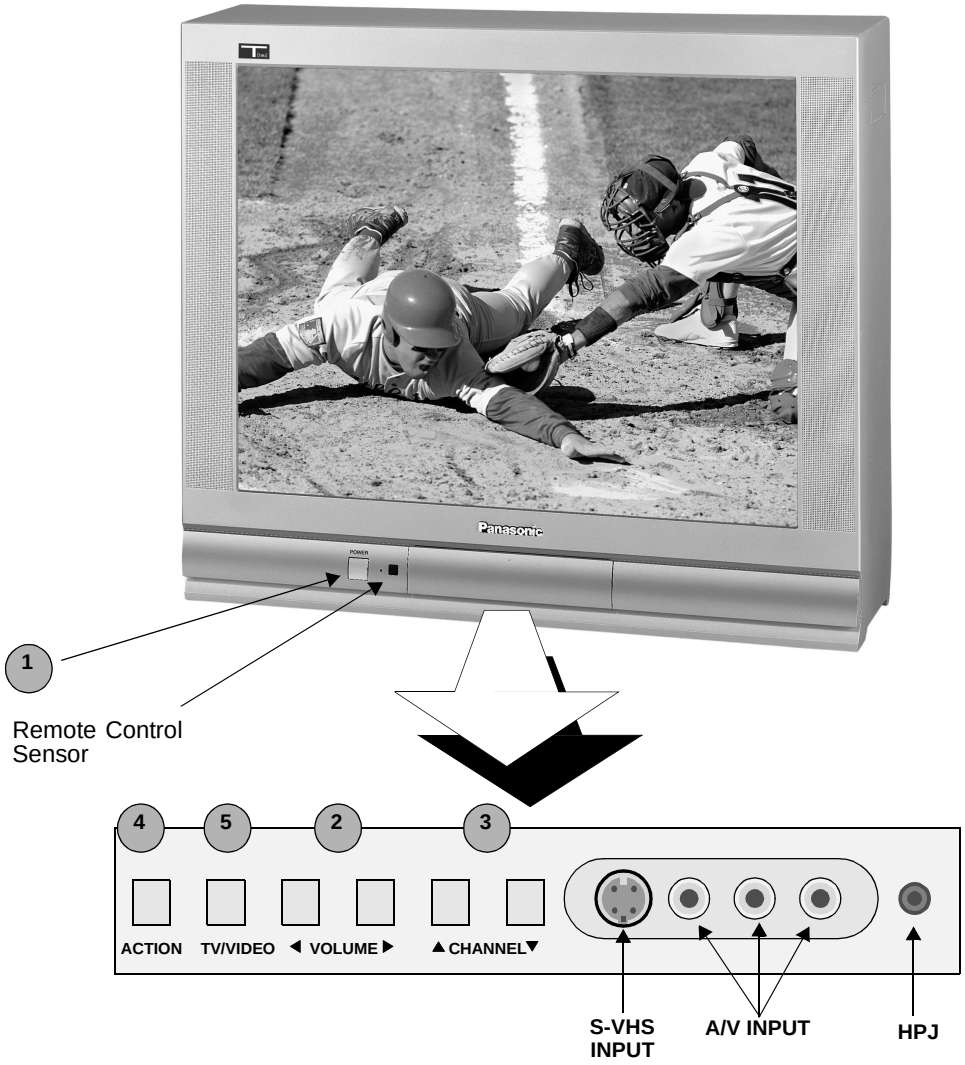


Figure 2. Location of Controls Receiver

Quick Reference Control Operation

Quick Reference Control Operation	
1	**Power Button -** Press to turn ON or OFF.
2	**Volume Buttons -** Press to adjust Sound Level, or to adjust Audio Menus, Video Menus, and select operating features when menus are displayed
3	**Channel Buttons -** Press to select programmed channels. Press to highlight desired features when menus are displayed. Also use to select Cable Converter box channels after programming Remote Control Infrared codes (the TV/AUX/CABLE switch must be set in CABLE position).
4	**Action Button -** Press to display Main Menu and access On Screen feature and Adjustment Menus.
5	**TV/Video Button -** Press to select TV or any Video Input, for the Main Picture

Location of Controls (Remote)

POWER Button
Press to turn ON and OFF.
MUTE Button
Press to mute sound. A second press resumes sound. Press also to access and delete Closed Caption display.
VCR, DVD, TV, CBL, DBS
Component function buttons
VOL (volume) Buttons
Press to adjust TV sound level. Use with Channel buttons to navigate in menus.
R-TUNE (Rapid Tune) Button.
Press to switch to the previous channel.
ACTION Button
Press to display Main Menu and access or exit On Screen features and Adjustment Menus.
REW, PLAY, FF, TV/VCR, STOP, PAUSE, REC, VCR CHANNEL
Component function buttons.

LIGHT
Press to light Remote control buttons
TV/VIDEO Button
Press to select TV or Video inputs.
CH (channel) Buttons
Press to select channels. Use with volume buttons to navigate in menus.
DBS EXIT, DBS GUIDE
DBS function buttons.
RECALL Button
Press to display Time, status of Sleep Timer, Channel, Video mode and Channel Caption (Station Identifier).
“0” - “9”
Press numeric keypad to select any channel.

EUR511502

Figure 3. Location of Controls (Remote)

For more functions and information about this Remote Control, refer to the Remote Guide listed in Parts List of this manual

Disassembly for Service

Back Cover

Remove all the screws marked with an arrow(◄) from the back of the Receiver.

Note: *Screw configuration, type, and number of screws vary depending on the model of the Receiver serviced and the application; various models are covered in this Manual. Use same hardware when reassembling the receiver.*

- 3 screws at the top edge of the Receiver.
- 1 screw at each lower corner of the Receiver.
- 2 screws by the A/V bracket top edge.
- 1 screw by the A/V bracket bottom edge.

A-Board - Main Chassis (See Fig. 5)

The Q and H-Board are assembled on the Main chassis (A-Board). When servicing these boards, extension cables may be required. Cables kit can be ordered from Matsushita Services Company, see Parts List for parts number. The A-Board assembly rest on a chassis tray along with the G-Board.

Slide chassis tray out. Gently lift, tray and pull out. Disconnect plug connectors; release wire ties and holders as required for complete chassis removal.

- A-Board is secured to the chassis tray with 8 screws.
- The G-Board is secured to the chassis tray with 5 screws
- The A-Board is mated to the G-Board with to flexible connectors: A22 & A23 (G2 and G3 on the G-Board, respectively). To remove either boards, unplug the connectors on the A-Board.

Note: *Some tie-wraps that secure the wire dressings may need to be unfastened for chassis removal.*

C-Board - CRT Output

Plugs into the socket on the CRT neck.

To unplug Screen and Focus cables from CRT socket, lift the tabs on the socket and pull the cables as shown. To plug cables, close the tabs then insert the cable.

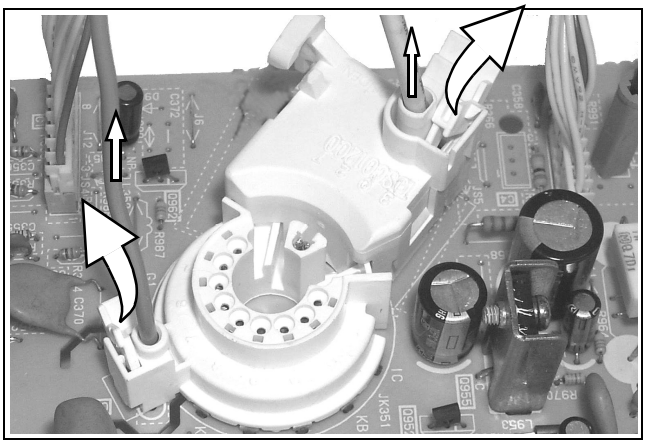


Figure 4. Focus and Screen cables.

H-Board - A/V Jacks, S-Video Connectors and Video Switch

Plugs onto the A-Board at the A11 (H11) connector

Q-Board - Horizontal Drive

Plugs onto the A-Board at the A6, A7 and A8 (QC6, QC7 and QC8) connectors. Is secured to Q551 heat sink by two screws.

Note: *Use a small flat head screwdriver to release the connector locking tabs.*

Speaker Dome

Each speaker is secured to the speaker plastic bracket with 2 screws. (See Fig. 6)

Disassembly for CRT Replacement

1. Discharge the CRT as instructed in the **Safety Precautions** (see page 2) and remove 2nd anode button from the CRT.
2. Remove Speaker Modules (R & L)
3. Disconnect:
   A-Board = Deflection Yoke (DY), Deg. Coil
   G-Board = Speakers (G8), Geo Coil (G15)
   C-Board = C2 Conv. Yoke, C1 DAG GND.
4. Remove Convergence and Deflection Yoke from CRT neck.
5. Perform complete removal of the Main Chassis, G-Board and CRT-Board as instructed in **Disassembly for Service.**

CRT Replacement

1. Perform **Disassembly for CRT Replacement** procedure.
2. Insure that the CRT H.V. Anode button is discharged before handling the CRT. Read the **Safety Precautions** (see page 2) on handling the picture tube.
3. Remove the components from the CRT neck and place the cabinet face down on a soft pad.
4. Note the original order for the CRT mounting hardware as they are remove from the CRT mounting brackets at each corner of the CRT.
5. Remove the CRT with the degaussing coil and the dag ground braid attached.
6. Note the original locations and mounting of the degaussing coil and the dag ground assembly to insure proper reinstallation on the replacement CRT.
   To remove and remount the degaussing coil:
   The degaussing coil is held in place by clampers fastened to the CRT corner ears. These clampers must be installed onto the replacement CRT prior to mounting the degaussing coil.
   To remove and remount the dag ground braid:
   a. Unhook the coil spring from the bottom corners of the CRT ears.
   b. Release the braid loop from the upper corners of the CRT ears.
7. Mount the dag ground braid on the replacement CRT. Position the degaussing coil with new ties. Dress coil as was on the original CRT.
8. Replace the components on CRT neck and reinstall into cabinet. Verify that all ground wires and circuit board plugs get connected.

Identification of Main Components

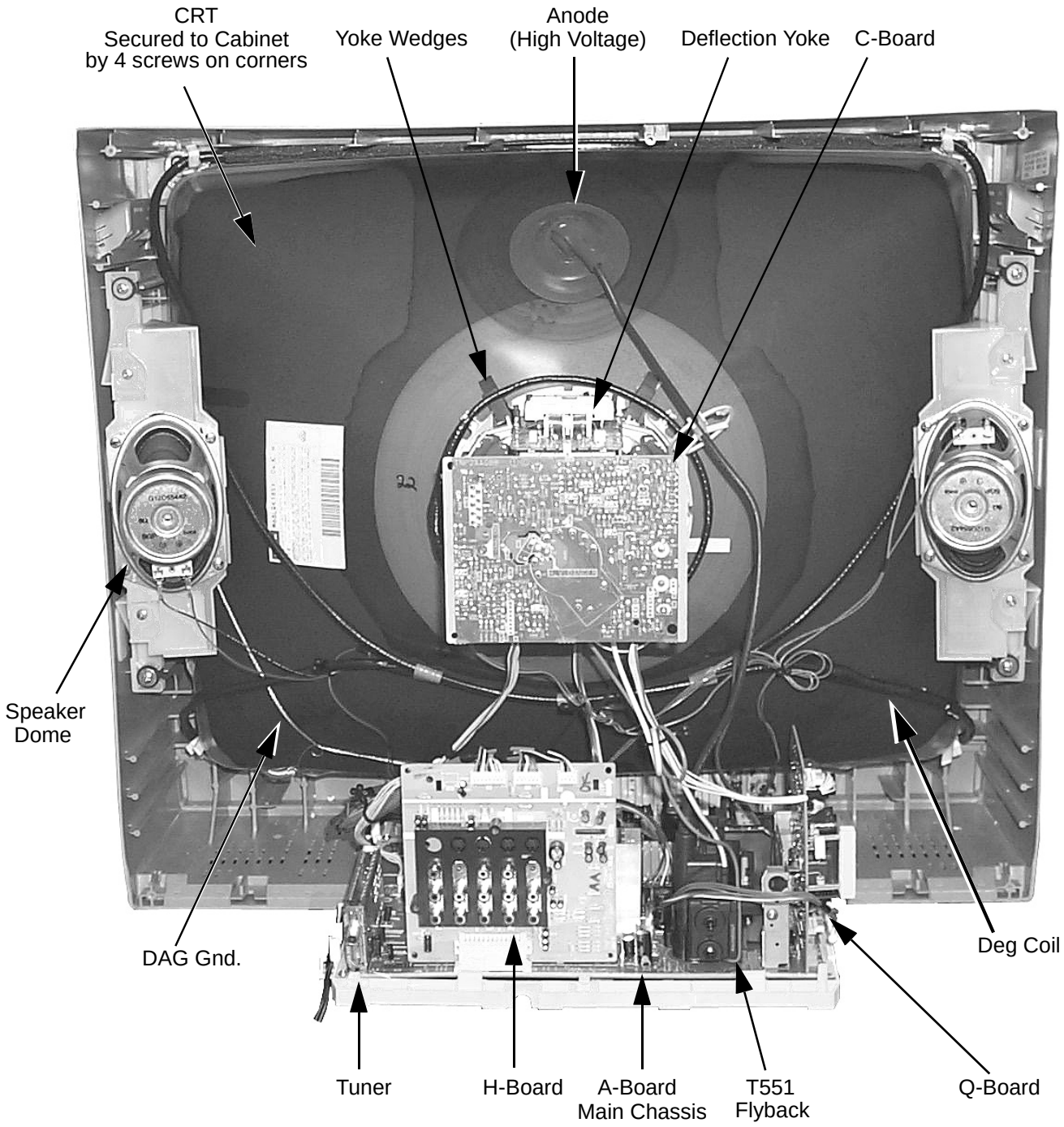


Figure 5. Components Identification

Note: After servicing the receiver, remember to dress the cables, as shown above.

Identification of Main Components

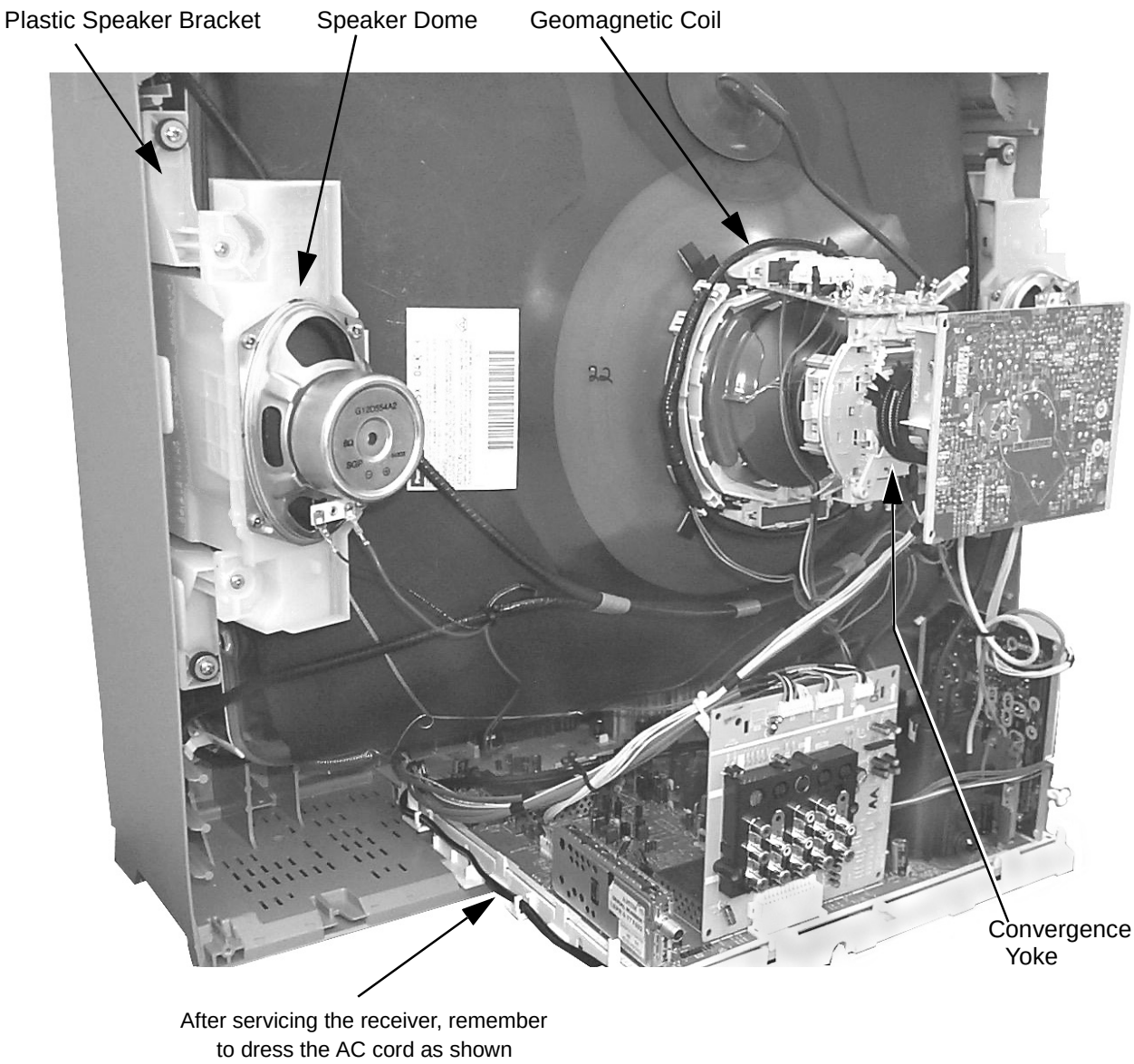

Plastic Speaker Bracket
Speaker Dome
Geomagnetic Coil
Convergence Yoke
After servicing the receiver, remember to dress the AC cord as shown

Figure 6. RECEIVER REAR VIEW DETAIL

Note: After servicing the receiver, remember to dress the cables, as shown above.

Identification of Main Components

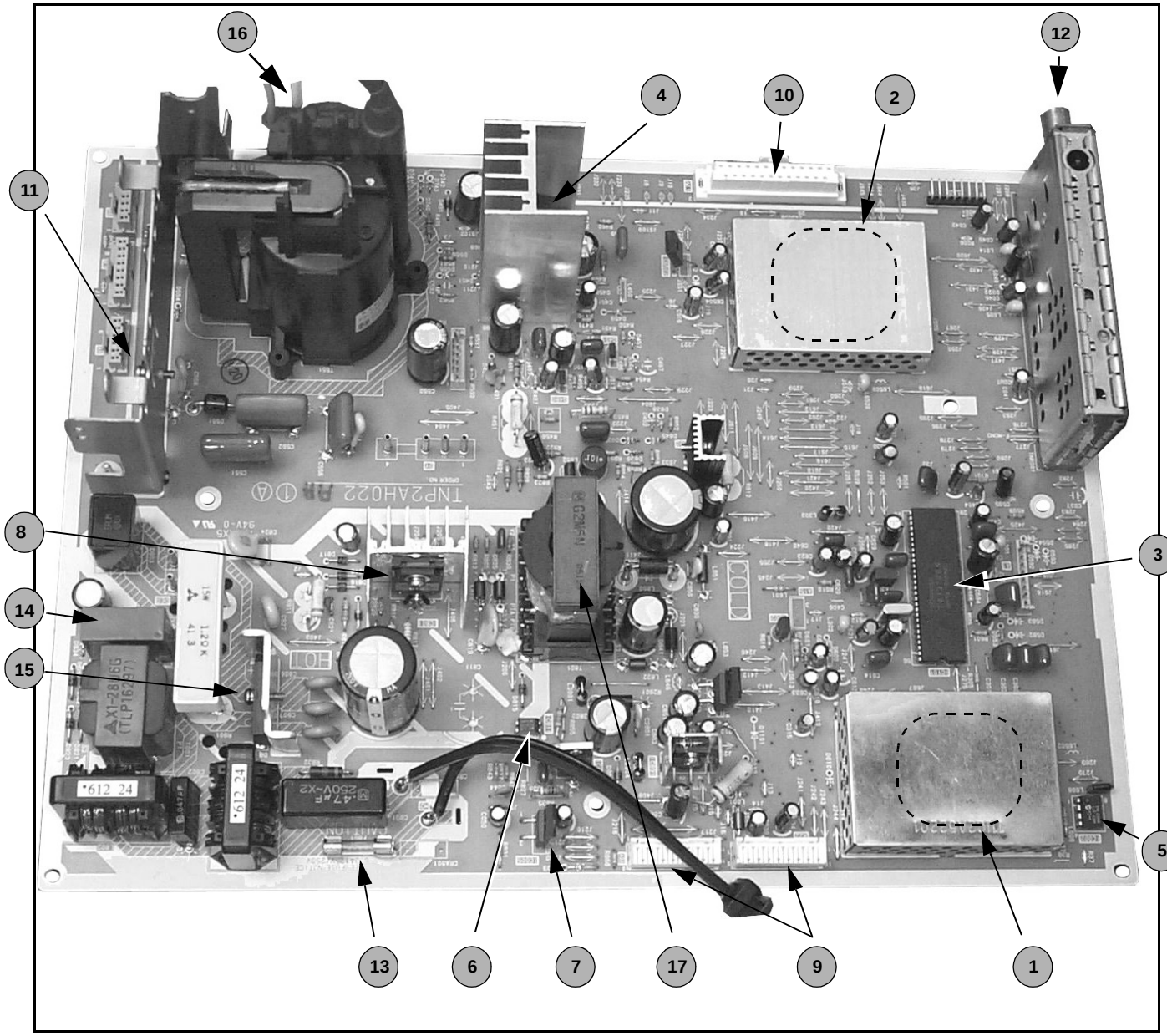


Figure 7. View of Main Board Assemblies.

NO.	LOCATION OF COMPONENTS				
INTEGRATED CIRCUITS		7	IC005	**OTHERS**	
1	IC001 MPU	8	IC801	12	Tuner
2	IC6501 Comb Filter	**CONNECTORS**		13	Fuse
3	IC101 VCJ	9	A22,A23	14	Relay
4	IC 451	10	A11	15	D801
5	IC 002	**TRANSISTORS**		16	T551 FBT
6	IC 811 COUPLER	11	Q551	17	T801

Identification of Main Components

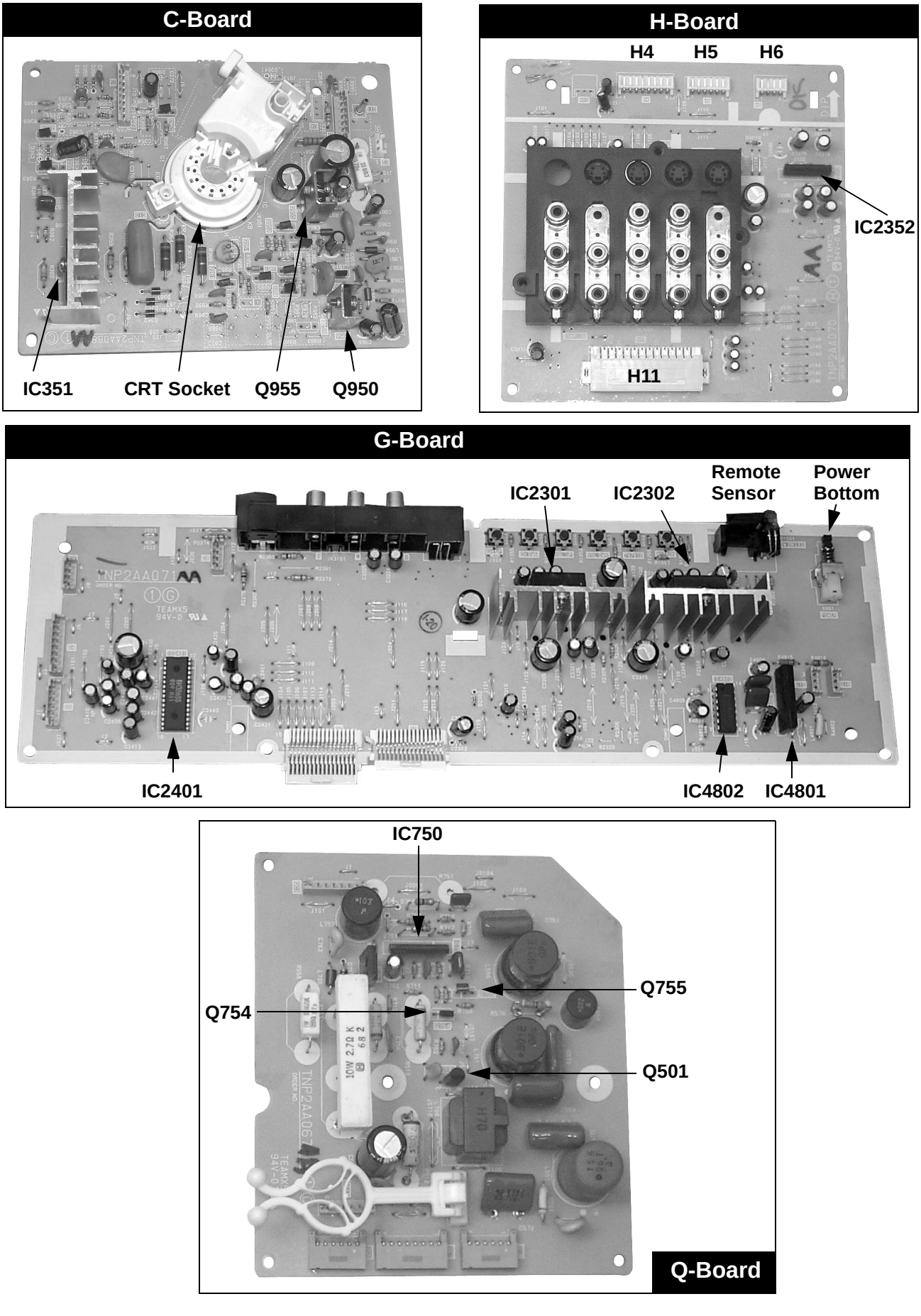


Figure 8. C, H, G and Q Board Main Components.

Purity and Convergence Procedure

Adjustment is necessary only if the CRT or the deflection yoke is replaced or if the setting was disturbed. The complete procedure consists of:

1. Vertical Raster Shift Adjustment.
2. Initial static convergence.
3. Setting the purity.
4. Final static convergence.

When the CRT or the Yoke is Replaced

Place the yoke on the CRT neck (do not tighten the clamp).

Position purity/convergence assembly as shown and tighten clamp snugly. Remove the hot-melt glue seal on assembly and position like tabs of purity device together at 12 o'clock to reduce its magnetic field effect.

Place the vertical raster shift tabs at 3 o'clock (90º from the purity and convergence tabs, see Fig. 9 and Fig. 10*)*

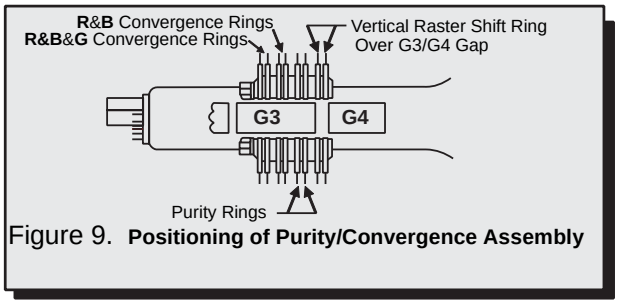


Figure 9. **Positioning of Purity/Convergence Assembly**

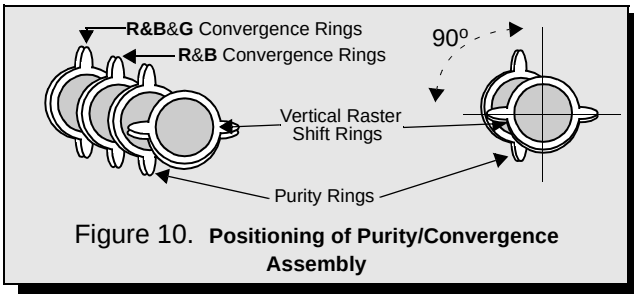


Figure 10. **Positioning of Purity/Convergence Assembly**

Turn the Receiver ON. Operate the Receiver for 60 minutes using the first Purity Check field (white screen) to stabilize the CRT.

Fully degauss the Receiver by using an external degaussing coil.

Slide the deflection yoke back and forth on the neck of the CRT until it produces a near white, uniform raster.

Vertical Raster Shift Adjustment

Apply a green pattern with a horizontal line, adjust the Deflection Yoke so that has no tilt, then secure it.

Adjust center line of the pattern with the mechanical center of the CRT, this center is determined by two marks at the side edges of the screen. To adjust the line, once the vertical raster shift tabs are place at 3 o'clock to reduce its magnetic field effect (see Fig. 9 and Fig. 10) open the tabs the same angle from the center, until the center line of the pattern becomes a straight line, centered with the marks of the CRT. (see Fig. 11)

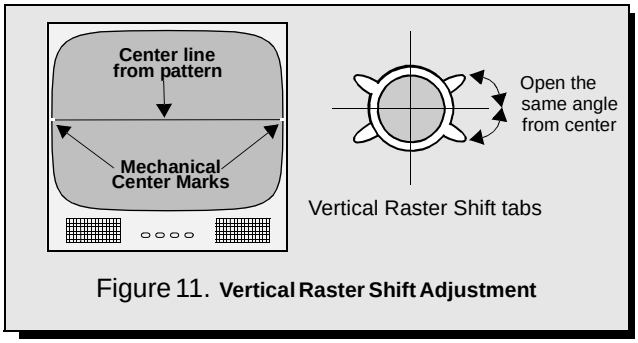


Figure 11. **Vertical Raster Shift Adjustment**

Initial Center Static Convergence

Connect a dot/cross hatch generator to the Receiver and tune in a signal. Observe misconvergence at center of the screen only.

Adjust the R&B pole magnets; by separating tabs and rotating to converge blue with red.

Adjust the R&B and R&B&G pole magnets: by separating tabs and rotating to converge blue and red (magenta) with green.

Note: *Precise convergence at this point is not important.*

Purity Adjustment

When the Receiver is in the Serviceman Mode for making electronic adjustments, press the **Recall** button on the Remote Control to enter Purity Check. (See the **Service Adjustments Electronic Controls** procedure).

Operate the Receiver for 60 minutes using the first Purity Check field (white screen) to stabilize the CRT.

Fully degauss the Receiver by using an external degaussing coil.

Press the **Recall** button on the Remote Control again until the Purity Check (green screen) appears.

Loosen the deflection yoke clamp screw and move the deflection yoke back as close to the purity magnet as possible.

Adjust the Purity rings to set the vertical green raster precisely at the center of the screen (see Fig. 12).

NOTES:
1. CRT warm up with white screen (three guns activated) is needed to stabilize the shadow mask expansion.
2. Initial center static convergence (roughly centers three gun beams) is required in order to perform purity adjustment.

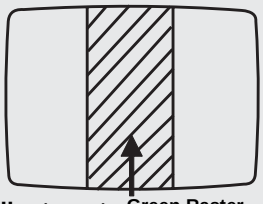


Figure 12. **Green Raster Adjustment**

Slowly move the deflection yoke forward until the best overall green screen is displayed.
Tighten the deflection yoke clamp screw.
Press the **Recall** button on the Remote Control again until the purity check (blue screen) and (red screen) appear and observe that good purity is obtained on each respective field.
Press the **Recall** button on the Remote Control again until Purity check (white screen) appears. Observe the screen for uniform white. If purity has not been achieved, repeat the above procedure.

Final Convergence Procedure (see Fig. 13 through Fig. 15):

Note: *Vertical size and focus adjustments must be completed prior to performing the convergence adjustment. Connect a dot pattern generator to the Receiver. The* ***Brightness*** *level should not be higher than necessary to obtain a clear pattern.*

Converge the red and the blue dots at the center of the screen by rotating the R&B pole Static Convergence Magnets.

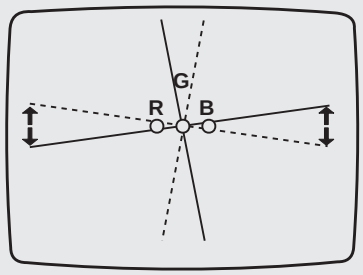
Align The converged red/blue dots with the green dots at the center of the screen by rotating the R&B&G pole Static Convergence Magnets. Melt wax with soldering iron to reseal the magnets.
Slightly tilt vertically and horizontally (do not rotate) the deflection yoke to obtain a good overall convergence.
If convergence is not reached at the edges, insert permalloy (see following section) from the DY corners to achieve proper convergence. Recheck for purity and readjust if necessary.
After vertical adjustment of the yoke, insert wedge at 11 o'clock position, then make the horizontal tilt adjustment.
Secure the deflection yoke by inserting two side wedges at 3 and 7 o'clock positions.
Apply adhesive between tab (thin portion) of wedge and CRT and place tape over the tab to secure to the CRT.

Permalloy Convergence Corrector Strip (Part No. 0FMK014ZZ)

This strip is used in some sets to match the yoke and CRT for optimum convergence. If the yoke or CRT is replaced, the strip may not be required.
First converge the set without the strip and observe the corners.

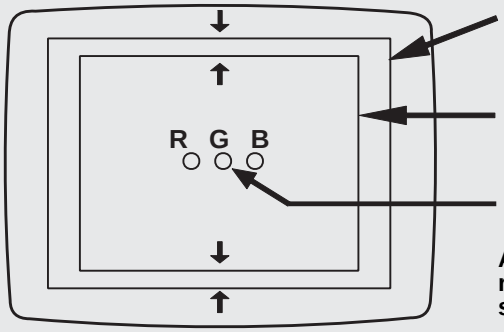
If correction is needed:

1. Place strip between CRT and yoke, in quadrant needing correction. Slowly move it around for desired results.
2. Press adhesive tightly to the CRT and secure with tape.



As the yoke is tilted vertically, the rasters produced by the outside guns rotate in opposite directions.

Figure 13. **Vertical Yoke Movement**



Raster produced from one of the outside electron beams

Raster from the other side electron beam

Static convergence magnets are set for center convergence

As the yoke is tilted horizontally, one raster gets larger while the other gets smaller

Figure 14. **Horizontal Yoke Movement**

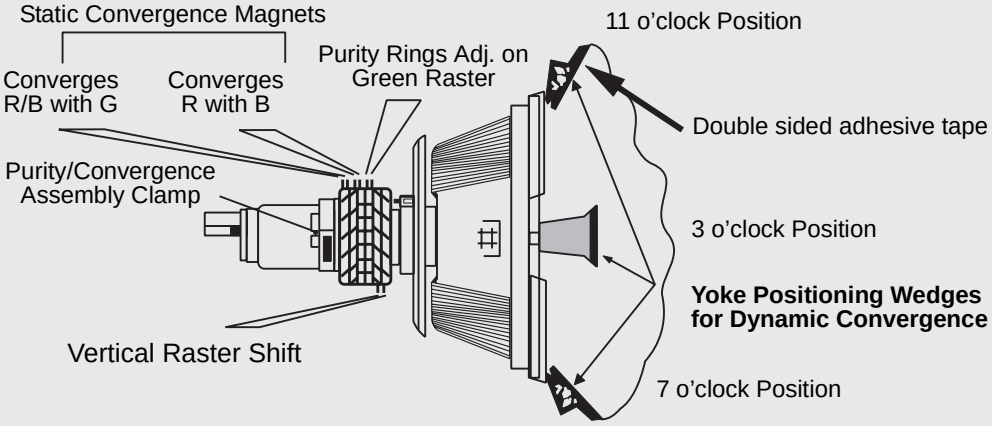
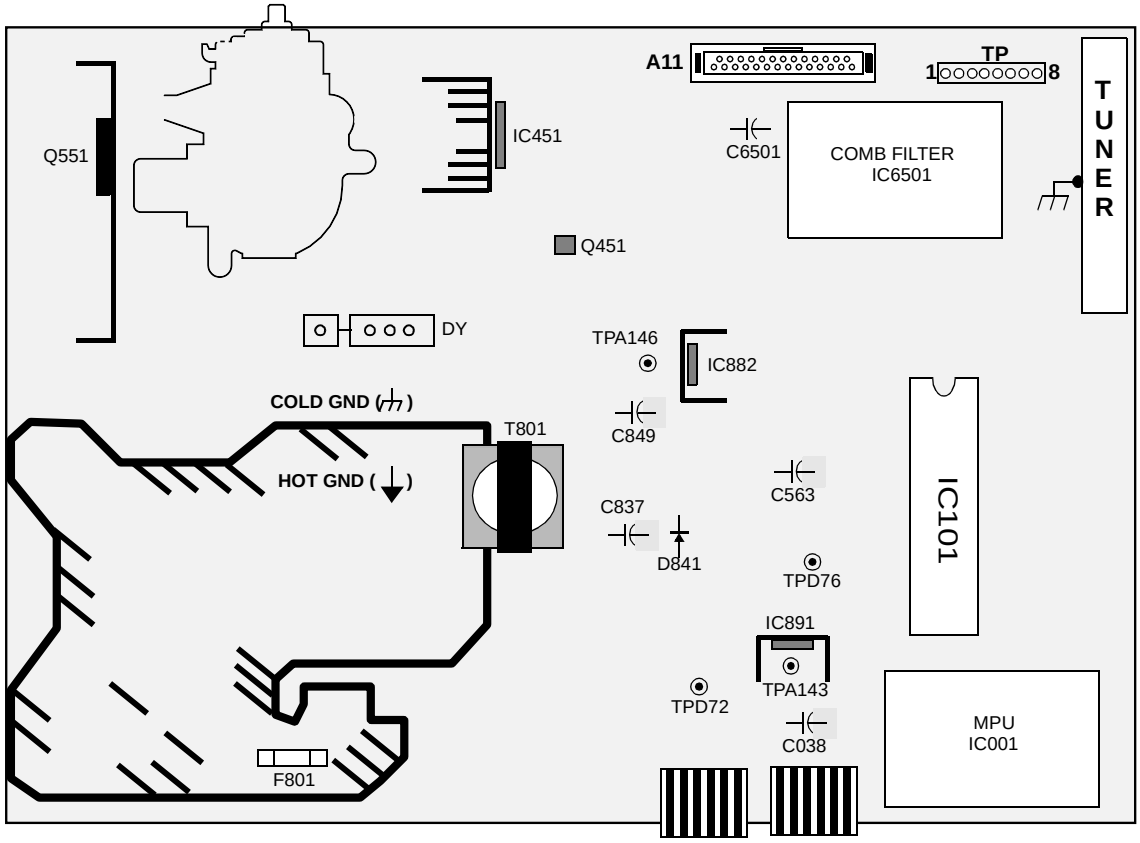


Figure 15. **Convergence Magnets and Wedges Location**

Chassis Service Adjustment Procedures

All service adjustments are factory preset and should not require adjustment unless controls and/or associated components are replaced.

Note: *Connect the (-) lead of the voltmeter to the appropriate ground. Use IC801's heat sink when the HOT ground symbol (⏚) is used. Otherwise, use COLD ground (⏚) — Tuner shield, IC451's heat sink or FA2(TP-3).(See Fig. 7)*



140.0V B+ Voltage Confirmation

1. Set the **Bright**, **Picture and Color** to Minimum by using the Picture Menu.
2. Connect the DVM between C849, **+** side (A-Board) and cold ground (⏚).
3. Confirm that B+ voltage is **140.0V ± 1.5V**. This voltage supplies B+ to the Horizontal Output & Flyback circuits.

Source Voltage Chart

120V AC line input. Set the **Bright** and the **Picture** to Minimum by using the Picture Menu. Use cold (⏚) or Hot (⏚) ground for the (-) lead of the DVM as needed.

LOCATION (A-Board)	VOLTAGE
TPD72	24 ± 2 V DC
C837 (+)	13.0 ± 2 V DC
TPA143	9.0 ±1 V DC
TPD76	12.0 ± 0.5 V DC
TPA146	5.0 ± 0.25 V DC
C6501 (+)	5.0 ± 0.25 V DC
C038 (+)	3.3 ± 0.1 V DC

Set all adjustments to normal level.

High Voltage Check

1. Select an active TV channel and confirm that horizontal is in sync.
2. Adjust Brightness and Picture using Picture Icon menu so video just disappears.
3. Confirm B+ 140V is within limit.
4. Using a high voltage meter confirm that the High Voltage is **30.55kV ± 1.25kV**.

Deflection Circuit Preadjustment

Preparation:

1. Connect a High voltage meter (Capable of handle 50kV) to the CRT anode.
2. Connect the set to AC line and turn it on.

Procedure:

1. Apply a crosshatch pattern.
2. Set Picture Controls to minimum to obtain a black image.
3. Verify that the High Voltage meter reading is **30.55k ± 1.25k V.**
4. If the upper limit is out of tolerance, immediate service and correction is required to insure safe operation and to prevent the possibility of premature component failure.

Set Picture Controls to normal.

Serviceman Mode (Electronic Controls)

This Receiver has electronic technology using the I²C Bus Concept. It performs as a control function and it replaces many mechanical controls. Instead of adjusting mechanical controls individually, many of the control functions are now performed by using "On Screen Display Menu". (The **Serviceman Adjustment Mode**.)

Note: *It is suggested that the technician reads all the way through and understand the following procedure for Entering/Exiting the* ***Serviceman Adjustment Mode****; then proceed with the instructions working with the Receiver. When becoming familiar with the procedure, the Flow Chart for Serviceman Mode may be used as a quick guide.*

Quick Entry to Serviceman Mode:

When minor adjustments need to be done to the electronic controls, the method of Entering the serviceman Mode without removal of the cabinet back is as follows using the Remote Control:

1. Select SET-UP icon and select CABLE mode.
2. Select TIMER icon and set SLEEP time for 30 Min.
3. Press "ACTION" twice to exit menus.
4. Tune to the Channel 124.
5. Adjust VOLUME to minimum (0).
6. Press VOL ◀ (decrease) **on Receiver**. Red "CHK" appears in upper corner.

Note: *After Receiver is set into SERVICEMAN mode, set TIMER back to NO.*

To toggle between Aging and Serviceman modes:

While the "CHK" is displayed on the left top corner of the CRT, pressing "ACTION" and "VOL" UP on the TV simultaneously will toggle between the modes. Red "CHK" for Serviceman and yellow "CHK" for Aging.

7. **Press Power** on the **Remote Control** to select one of seven Serviceman Adjustment Modes.
   1. **B**= Serviceman VCJ SUB-DATA ADJUSTMENTS.
   2. **C**= Serviceman VCJ CUT-OFF ADJUSTMENTS.
   3. **D**= Serviceman GEOMETRIC ADJUSTMENTS.
   4. **S** = Serviceman S OPTION ADJUSTMENTS.
   5. **X** = Serviceman GEOMAGNETIC ADJUSTMENTS.
6. "**CHK**" = Normal operation of CHANNEL ▲▼ and VOLUME ◀ ▶.

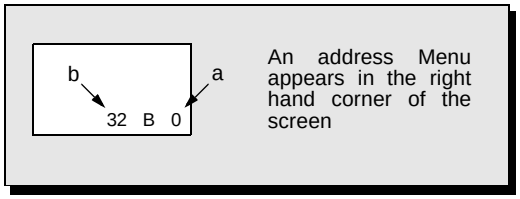


Figure 17. Serviceman Mode Menu Adjustments.

Exiting the Serviceman Mode:

Press **Action** and **Power** on the **Receiver** simultaneously for at least 2 seconds.

THE RECEIVER EXITS SERVICEMAN MODE.

The Receiver momentarily shuts off; then comes back on tuned to channel 3 with a preset level of sound. Any programmed channels, channels caption data and some others user defined settings will be erased.

IMPORTANT NOTE:
Always Exit the Serviceman Mode Following Adjustments.

To Check Purity:

Press **Recall** on the **Remote Control** when in Serviceman Mode (red "CHK" is displayed) to enter the Purity Field Check Mode.

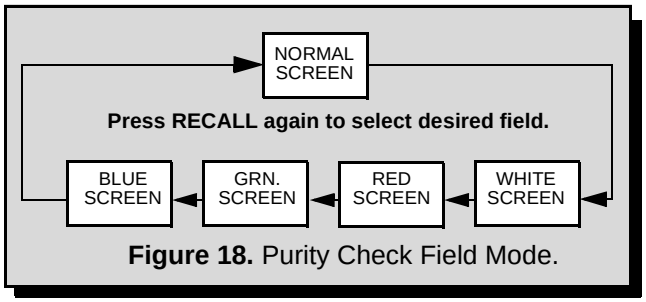


Figure 18. Purity Check Field Mode.

Helpful Hints

Entering Serviceman Mode (Back-Open Method)

- While the Receiver is ON and operating in Normal Mode, momentarily short test point **FA1** (TP8) to Cold Ground (⏚) **FA2** (TP3) A-Board.

  The Receiver enters the Aging Mode.
  Yellow letters "CHK" appear in the upper left corner of the CRT.
  (The Volume Up/Down will adjust rapidly).

Press the **Power Button** on the **Remote Control** to select the Serviceman Adjustment.

For Adjustments:

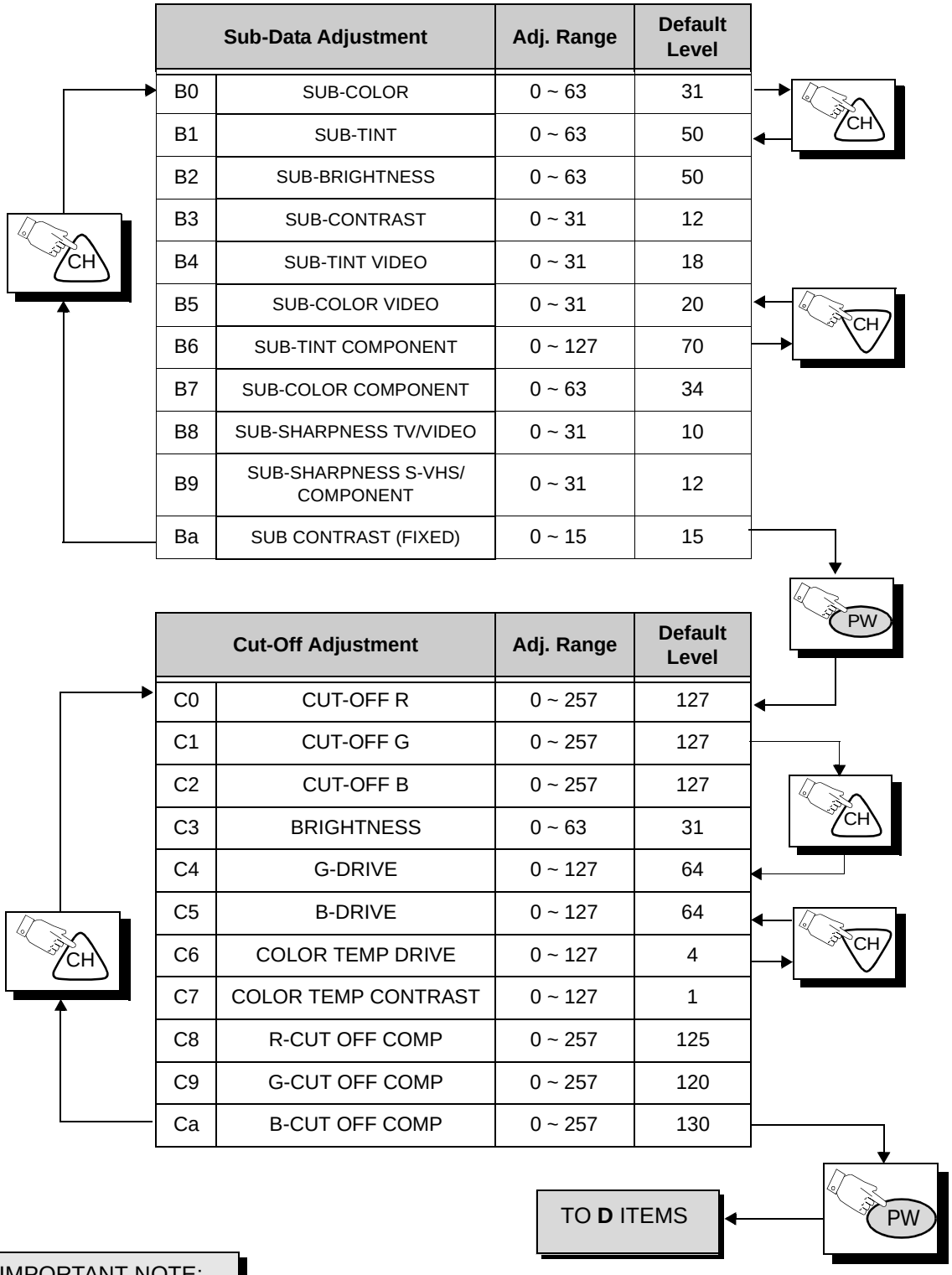
1. **Press Channel Up/Down** on the **Remote Control** to select one of the available Service Adjustments (**a** in Fig. 17).

Note: *Write Down the original value set (**b** in* Fig. 17*) for each address before modifying anything. It is easy to erroneously adjust the wrong item.*

2. **Press Volume Up/Down** on the **Remote Control** to adjust the level of the selected Service Adjustment (**b** in Fig. 17).

Sub-Data Adjustment		Adj. Range	Default Level
B0	SUB-COLOR	0 ~ 63	31
B1	SUB-TINT	0 ~ 63	50
B2	SUB-BRIGHTNESS	0 ~ 63	50
B3	SUB-CONTRAST	0 ~ 31	12
B4	SUB-TINT VIDEO	0 ~ 31	18
B5	SUB-COLOR VIDEO	0 ~ 31	20
B6	SUB-TINT COMPONENT	0 ~ 127	70
B7	SUB-COLOR COMPONENT	0 ~ 63	34
B8	SUB-SHARPNESS TV/VIDEO	0 ~ 31	10
B9	SUB-SHARPNESS S-VHS/ COMPONENT	0 ~ 31	12
Ba	SUB CONTRAST (FIXED)	0 ~ 15	15

Cut-Off Adjustment		Adj. Range	Default Level
C0	CUT-OFF R	0 ~ 257	127
C1	CUT-OFF G	0 ~ 257	127
C2	CUT-OFF B	0 ~ 257	127
C3	BRIGHTNESS	0 ~ 63	31
C4	G-DRIVE	0 ~ 127	64
C5	B-DRIVE	0 ~ 127	64
C6	COLOR TEMP DRIVE	0 ~ 127	4
C7	COLOR TEMP CONTRAST	0 ~ 127	1
C8	R-CUT OFF COMP	0 ~ 257	125
C9	G-CUT OFF COMP	0 ~ 257	120
Ca	B-CUT OFF COMP	0 ~ 257	130



IMPORTANT NOTE:
Always Exit the Serviceman Mode Following Adjustments.

Press the **Power Button** on the **Remote Control** to select the Serviceman Adjustment.

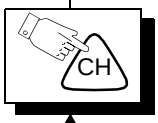
For Adjustments:

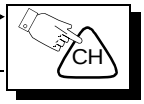
1. **Press Channel Up/Down** on the **Remote Control** to select one of the available Service Adjustments (**a** in Fig. 17).

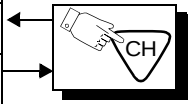
Note: *Write Down the original value set (**b** in* Fig. 17*) for each address before modifying anything. It is easy to erroneously adjust the wrong item.*

2. **Press Volume Up/Down** on the **Remote Control** to adjust the level of the selected Service Adjustment (**b** in Fig. 17).

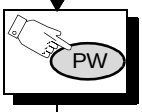
Geometric Adjustment		Adj. Range	Default Level
D0	H- CENTER	0 ~ 31	16
D1	V-AMPLITUDE	0 ~ 63	31
D2	V-S CORRECTION	0 ~ 7	4
D3	V-LIN CORREECTION	0 ~ 15	8
D4	E/W TRAPEZIUM	0 ~ 15	11
D5	V-AGC	0 ~ 1	1
D6	V-CENTER FINE	0 ~ 7	0
D7	V-CENTER GROSS	0 ~ 127	90
D8	V-CENTERING DAC SW	0 ~ 1	0
D9	**V-BLK START PHASE	0 ~ 31	12
Da	**V-BLK STOP PHASE	0 ~ 31	14
Db	E/W CORNER	0 ~ 15	8
Dc	PCC	0 ~ 31	14
De	H-WIDTH	0 ~ 63	31



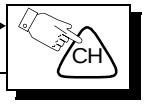


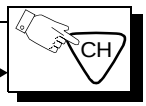


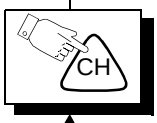
****NOTE**
THOSE ADJUSTMENTS ARE FACTORY PRESET. DO NOT CHANGE THE ORIGINAL VALUE.



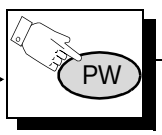
Service Adjustment		Adj. Range	Default Level
S0	ABL GAIN	0 ~ 3	3
S1	ABL POINT	0 ~ 3	2
S2	RGB BRIGHTNESS OSD	0 ~ 15	9
S3	RGB GAMMA	0 ~ 1	1
S4	COLOR GAMMA	0 ~ 1	1
S5	VSM GAIN	0 ~ 1	0
S6	BK START POINT	0 ~ 7	2
S7	CLOCK CORRECTION	0 ~ 255	128
S8	LOUDNESS COMP	0 ~ 63	63
S9	CAPTION DIG FILTER	0 ~ 1	0
Sa	CAPTION SCROLL MODE	0 ~ 2	1
Sb	RGB MATRIX	0 ~ 7	6
Sc	RGB MATRIX COMP	0 ~ 7	7
Sd	SURROUND EFFECT	0 ~ 15	6







TO **X** ITEMS



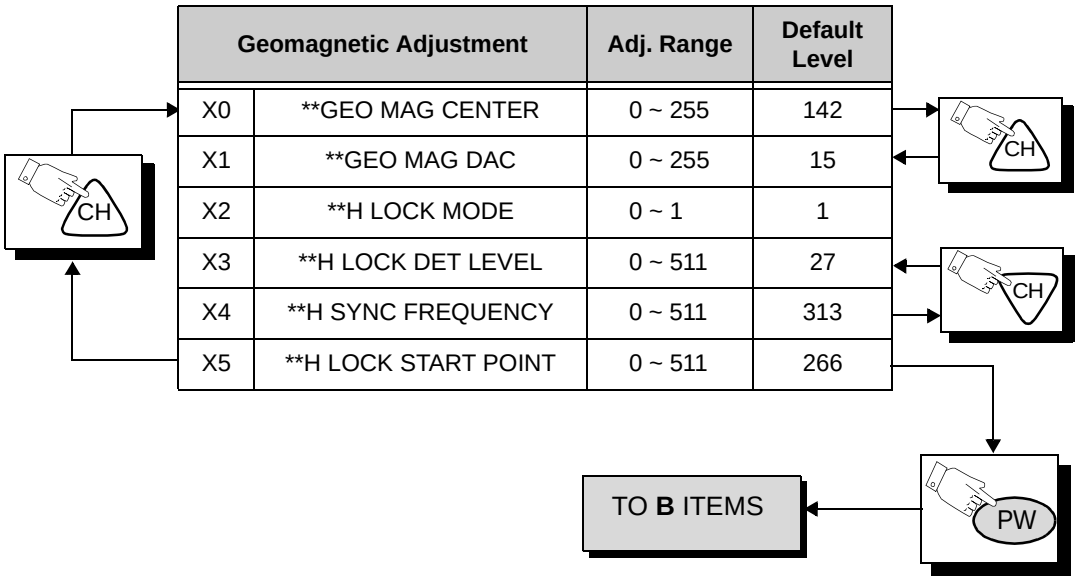
Press the **Power Button** on the **Remote Control** to select the Serviceman Adjustment.

For Adjustments:

1. **Press Channel Up/Down** on the **Remote Control** to select one of the available Service Adjustments (**a** in Fig. 17).

Note: *Write Down the original value set (**b** in* Fig. 17*) for each address before modifying anything. It is easy to erroneously adjust the wrong item.*

2. **Press Volume Up/Down** on the **Remote Control** to adjust the level of the selected Service Adjustment (**b** in Fig. 17).



Geomagnetic Adjustment		Adj. Range	Default Level
X0	**GEO MAG CENTER	0 ~ 255	142
X1	**GEO MAG DAC	0 ~ 255	15
X2	**H LOCK MODE	0 ~ 1	1
X3	**H LOCK DET LEVEL	0 ~ 511	27
X4	**H SYNC FREQUENCY	0 ~ 511	313
X5	**H LOCK START POINT	0 ~ 511	266

****NOTE**
THOSE ADJUSTMENTS ARE FACTORY PRESET. DO NOT CHANGE THE ORIGINAL VALUE.

IMPORTANT NOTE:
Always Exit the Serviceman Mode Following Adjustments.

Instructional Flow Chart for Serviceman Mode

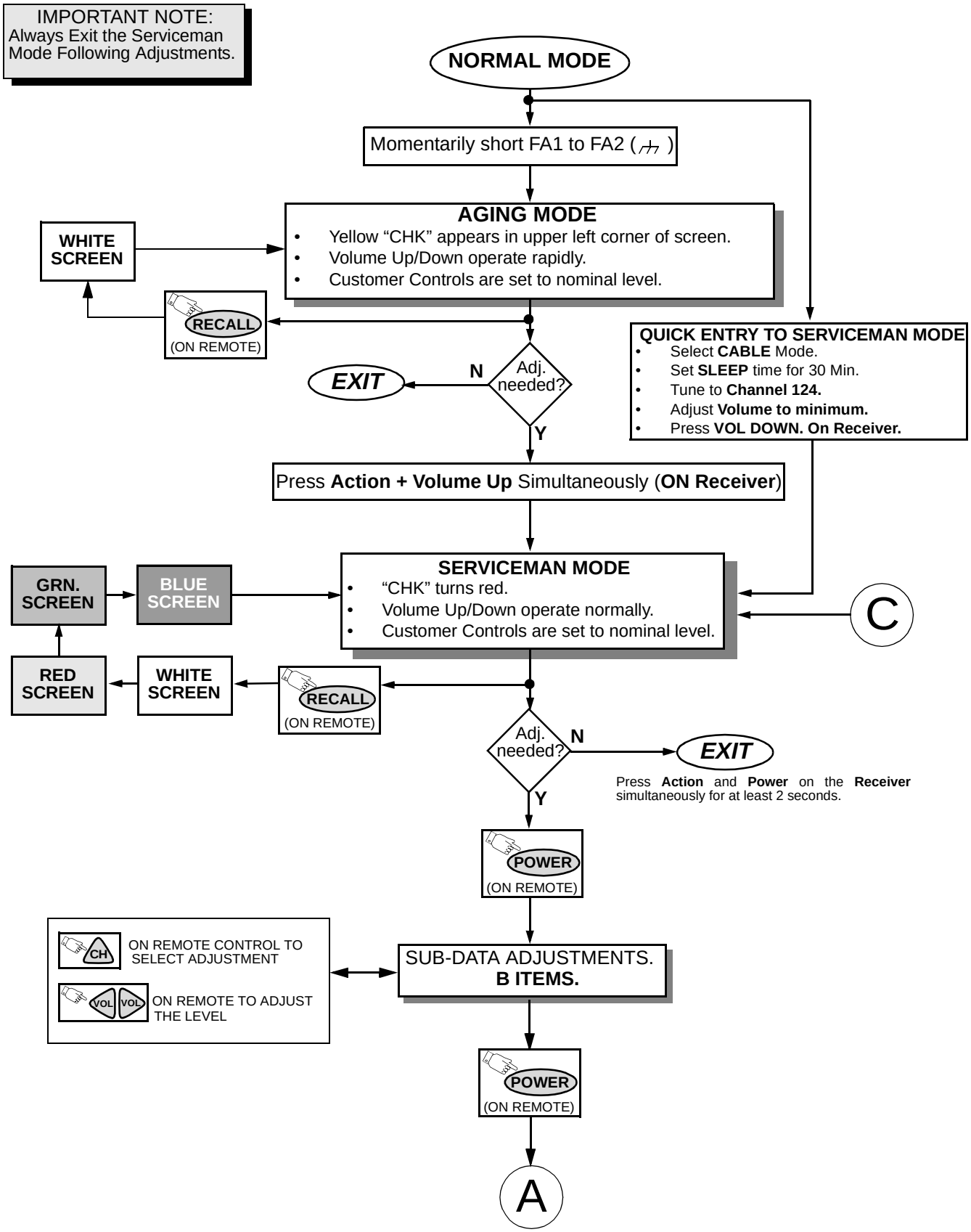


Figure 19. Flow Chart for Serviceman Mode.

Instructional Flow Chart for Serviceman Mode - Continued

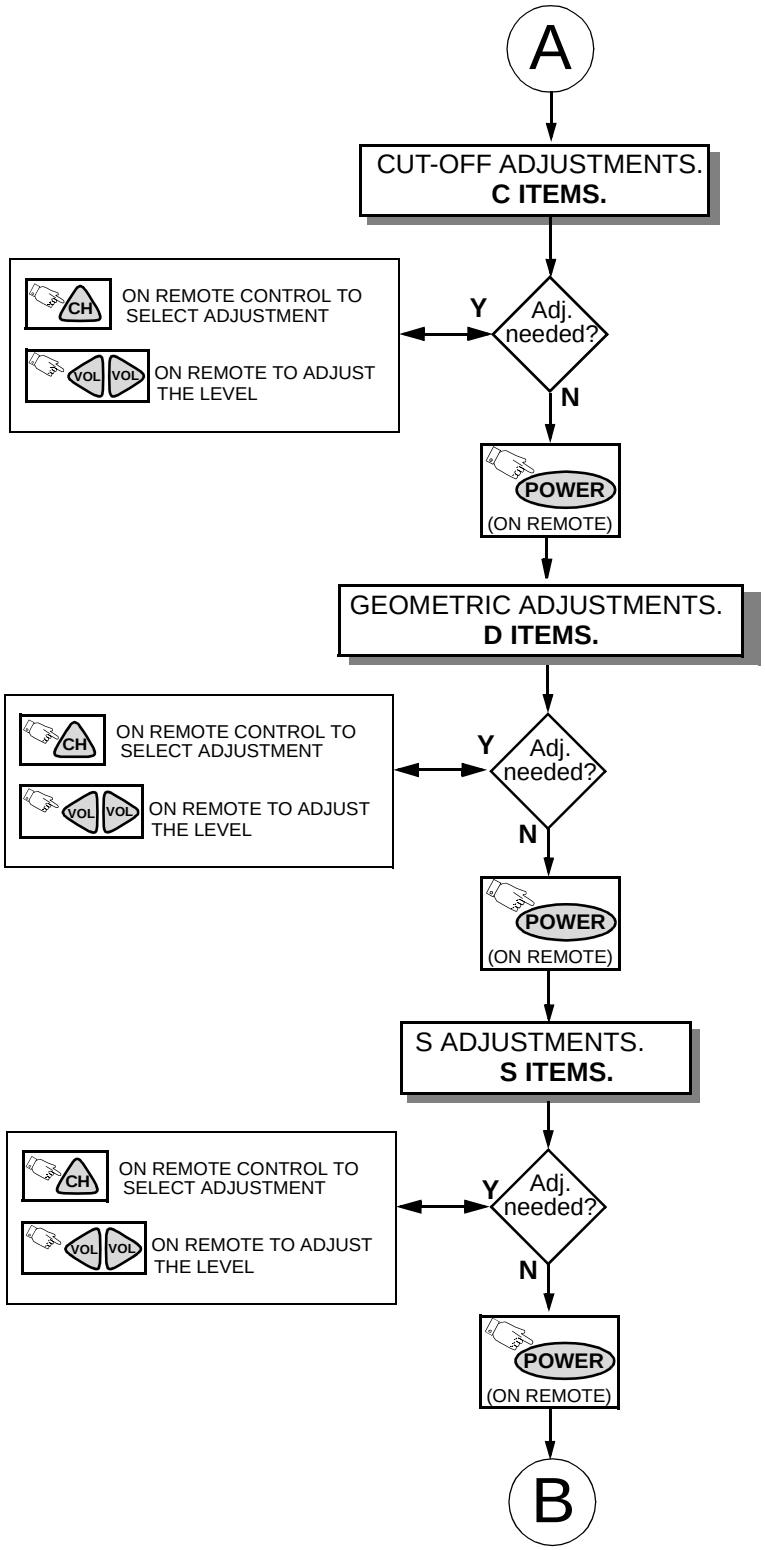
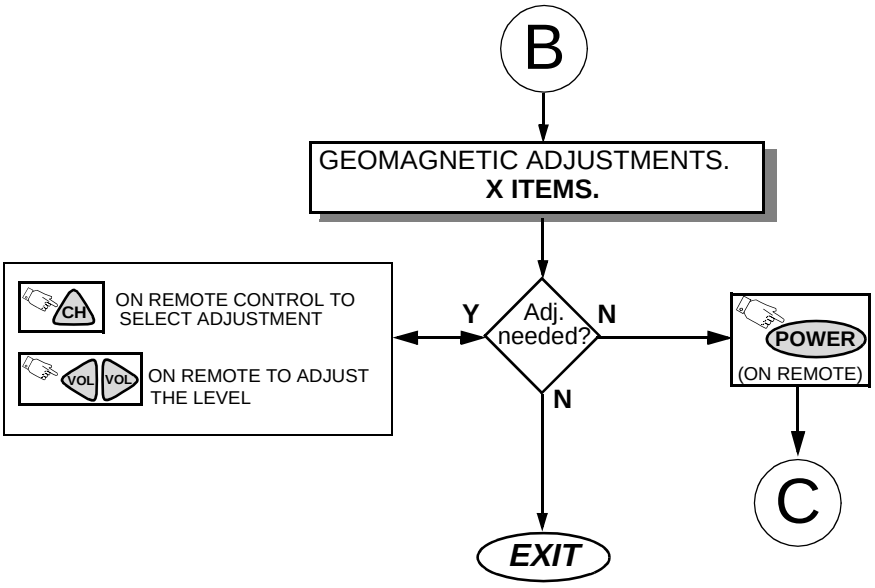


Figure 20. Flow Chart for Serviceman Mode (Continued).

IMPORTANT NOTE:
Always Exit the Serviceman Mode Following Adjustments.

Instructional Flow Chart for Serviceman Mode - Continued



Press **Action** and **Power** on the **Receiver** simultaneously for at least 2 seconds.

IMPORTANT NOTE:
Always Exit the Serviceman Mode Following Adjustments.

Figure 21. Flow Chart for Serviceman Mode (Continued)

Service Adjustments (Electronic Controls)

Note: *Turn the Receiver ON. Operate the Receiver for 60 minutes using the first Purity Check field (white screen) to stabilize the CRT. Fully degauss the Receiver by using an external degaussing coil.*

Sub-Brightness

Serviceman DAC Adjustment (B2)

Adjustment of this control is important for setting proper operation of customer brightness and picture controls. This adjustment must be made after Sub-Contrast or Color Temperature adjustments are made. **Do not adjust** the SCREEN VR after the Sub-Brightness is set.

Preparation:

3. Preset the following controls:
   - Tint. . . . . .Center.
   - Color . . . . . .Center.
   - Picture . . . . . .Max.
4. Apply a Black and White cross pattern.
5. Operate the Receiver for a minimum of 30 minutes prior to performing this adjustment.

Procedure:

In the Serviceman Mode for making electronic adjustments, select the DAC adjustment (B2) and adjust until the 7.5 IRE part is the same light output as 3 IRE part.

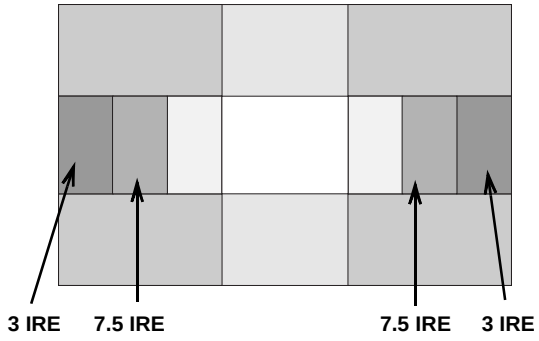


Figure 21. **Sub-Bright Pre adjustment**

You may set the accurate value following the Preparation steps and the Procedure step No. 1 of the Sub-Contrast adjustment described below.

Sub-Contrast

Serviceman DAC Adjustment (B3)

This adjustment is factory set. **Do not adjust** unless repairs are made to associated circuit, the CRT Board or when the CRT is replaced.

Preparation:

1. Apply a color bar signal pattern with 87.5% modulation, 70% saturated color bar with a 100 IRE white and 7.5 black.

Note: *The pattern used in this procedure is an EIA color bar pattern with 87.5% modulation with 100 IRE white and 7.5 black. Correlate the information in this procedure to the pattern used if another signal is used.*

2. Preset the following controls:
   - Brightness . . . . . .Center.
   - Color . . . . . .Min.
   - Picture . . . . . .Max.
   - Sharpness . . . . . .Center.
3. Set RGB Gamma Register OFF (S3 to 0)
4. Connect the oscilloscope to TP47R (A-Board, below IC101).
5. Set the scope time base to 20μs (horizontal).
6. Connect a jumper from TPD2 to ground (⏚).

Procedure:

1. In the Serviceman Mode, select DAC Sub-Brightness Adjustment (B2) and adjust for **1.5~1.9Vp-p** between blanking and 7.5 IRE level.

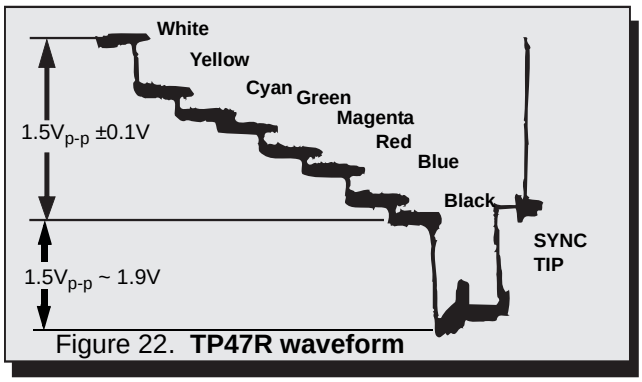


Figure 22. **TP47R waveform**

2. In the Serviceman Mode for electronic adjustments, select DAC Sub-Contrast Adjustment (B3) and adjust for **1.5Vp-p ± 0.1V** from white level to black level on video waveform (see video waveforms detail, Fig. 22).
3. Remove the jumpers (Preparation step 6).
4. Set S3 to 1.

Tint/Color Adjustment

Serviceman DAC Adjustment (B1) (B0)

Preparation:

1. Preset the following controls:)
   - Tint. . . . . Center.
   - Color . . . . . Center.
   - Picture . . . . . Max.
   - Sharpness . . . . . Min.
   - Bright . . . . . Min.
   - Color Temp . . . . . Normal.
2. Set RGB Gamma Register OFF (S3 to 0).
3. Connect a jumper from TPD2 to ground (⏚).

Service Adjustments (Electronic Controls, cont.)

Procedure:
1. Apply a Color bar pattern.
2. Connect oscilloscope to TP47B (Blue Output) in A-board, below IC101.
3. Select DAC **Sub-Tint (B1)** and adjust waveform so that peaks 7 is halfway between peaks 5 and 6 as shown in Fig. 23

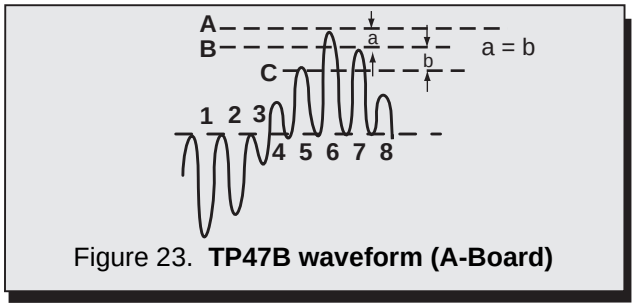


Figure 23. **TP47B waveform (A-Board)**

4. Connect oscilloscope to TP47R (Red Output), in A-Board, below IC101.
5. Select DAC **Sub-Color B(0)** and adjust for waveform to measure **1.3V ± 0.05Vp-p**, See Fig. 24

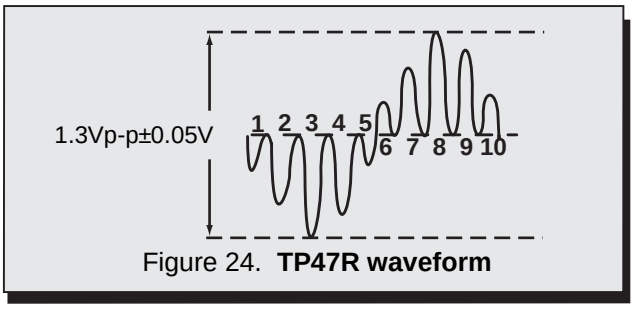


Figure 24. **TP47R waveform**

6. Remove jumpers (Preparation step 3).
7. Set DAC **S3 to 1.**
8. Confirm that the phase can be changed about ± 30^{o} by TINT CONTROL. (Tint ratio AB=1, AC=2).

Color Temperature Adjustment (B/W Tracking)

Serviceman DAC Adjust. (C0) (C1) (C2) (C4) (C5)
Minor Touch-Up Method

OBSERVE low and high brightness areas of a B/W picture for proper tracking. Adjust only as required for "good gray scale and warm highlights".

1. LOW LIGHT areas – In Serviceman Mode for making electronic adjustments, select Cutoff (C0) RED, (C1) GRN, (C2) BLU and adjust the picture for gray.
2. HIGH LIGHT areas – In Serviceman Mode for making electronic adjustments, select Drive (C4) GREEN, (C5) BLUE and adjust the picture for warm whites.

Complete Adjustment

Preparation:
1. Turn the Receiver "ON" and allow 45 minutes warm up at high brightness.
2. Apply a color bar signal with color "OFF".
3. Set Picture Icon Menu Video controls to Normalize.
4. Turn the SCREEN control (part of FBT T551) fully counterclockwise.
5. Set Service Switch On:
   Connect a jumper from Q451 (Base) to R812 +5V side. (TPA146 or IC882-3)
6. Preset the following Serviceman DACs for best results:
   - Red Cut-Off **C0** . . .128
   - Green Cut-Off **C1** . . .128
   - Blue Cut-Off **C2** . . .128
   - Green Drive **C4** 64
   - Blue Drive **C5** 64

Procedure:
1. Connect the oscilloscope to TP47R.
2. In Serviceman Mode for making electronic adjustment, select the Sub-Bright DAC (B2).
3. Observe oscilloscope waveform and adjust serviceman mode **Sub-Bright** DAC **(B2)** until **2.5V** above DC ground is measured (See Fig. 25)

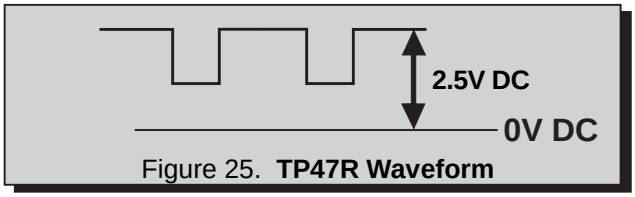


Figure 25. **TP47R Waveform**

4. Connect scope to RED Cathode (KR) on CRT-Board
5. In Serviceman mode for making electronic adjustments, select **RED CUTOFF** DAC **(C0)**
6. View scope trace at Horizontal rate and adjust Serviceman Mode DAC **(C0)** for the scanning period to be **170V** above DC ground (See Fig. 26.)

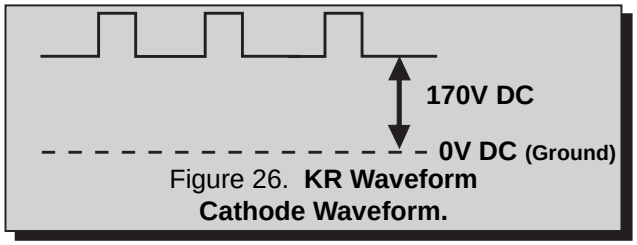


Figure 26. **KR Waveform**
Cathode Waveform.

7. Write the same data (C0 register value) to Green **C1** and Blue **C2**.
8. Turn SCREEN VR (Part of FBT) slowly clockwise until a faint horizontal line in color appears.
9. Using the Serviceman Mode Dac CUTOFF adjustments, increase their setting to produce a white horizontal line.
10. Confirm a good gray scale by viewing B/W color bar Pattern.
11. If correction is needed perform **Minor Touch-Up Method.**
12. Perform **Sub-Brightness** adjustment procedure if needed.

Service Adjustments (Electronic Controls, cont.)

Note: *Turn the Receiver ON. Operate the Receiver for 60 minutes using the first Purity Check field (white screen) to stabilize the CRT. Fully degauss the Receiver by using an external degaussing coil.*

Horizontal Center Adjustment

Serviceman DAC Adjustment (D0)

Preparation:

1. Preset the following controls:)
   - Picture . . . . . Max.
   - Bright . . . . . Center.

Procedure:

1. Apply a monoscope pattern.
2. Adjust Horizontal center register to center the monoscope pattern on the CRT.

E-W Pincushion Correction

Serviceman DAC Adjustment (Dc)

Preparation:

1. Apply a Crosshatch pattern
2. Normalize the Picture Icon Video adjustments.
3. Set:
   - Brightness . . . . . .Center.
   - Sharpness . . . . . .Center
   - Picture . . . . . .Max.

Procedure:

1. Enter Serviceman Mode, select DAC **Dc**. Adjust for 1st and 3rd vertical lines on E&W sides to be straight (See Fig. 27)

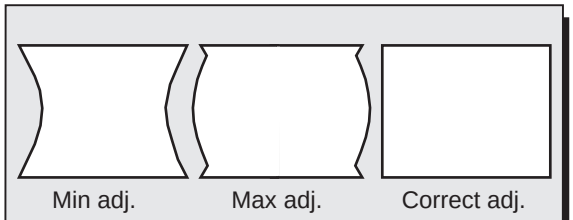


Figure 27. **E-W Pincushion Adjustment**

2. Select DAC **Db** and adjust vertical lines so that the top edge is straight (SeeFig. 28)

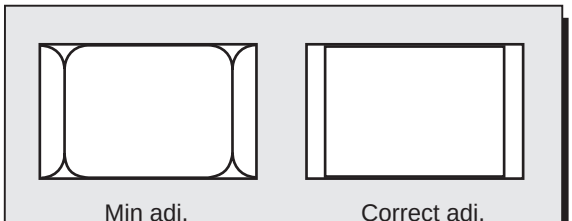


Figure 28. **Corner Pincushion Adjustment**

Horizontal Width Adjustment

Serviceman DAC Adjustment (Dd)

Preparation:

1. Apply a monoscope pattern.
2. Adjust **D0 Horizontal Center** until picture is centered.
3. Verify Horizontal Width is in normal range.
4. Apply a crosshatch pattern.
5. Adjust **Dc, E-W Pincushion** and **Db, Corners Pincushion** to obtain outside vertical lines as straight as possible.

Procedure:

1. Apply a monoscope pattern.
2. Adjust **Dd, Horizontal Width** until distance **A = B** (4.50 ± 0.40 aprox.) See Fig. 29.
3. Adjust **Vertical Size** to obtain a complete round pattern.

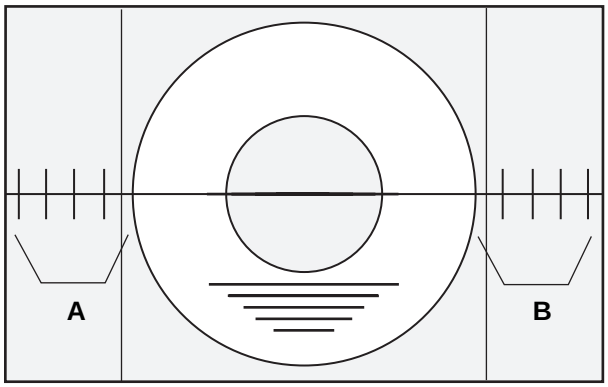


Figure 29. **Horizontal Size Adjustment**

Vertical Position, Vertical Size

Serviceman DAC Adjustment (D6, D1)

Preparation:

1. Apply a monoscope pattern.

Procedure:

1. Adjust **D7 Vertical Position** until picture is centered with the vertical center of the CRT. Use **D6** for fine adjustment.
2. Adjust **D1, for Vertical Size** to obtain a round monoscope pattern; distance **C = D.** See Fig. 30.

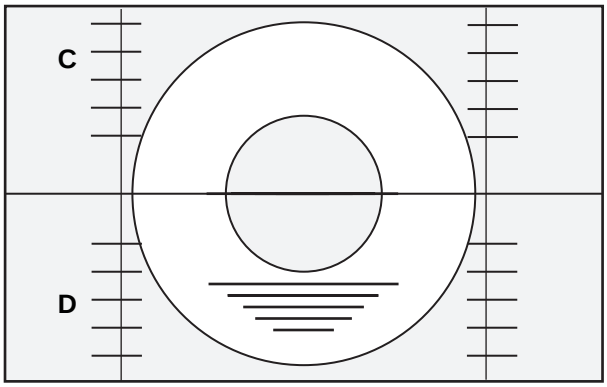


Figure 30. Vertical size adjustment

Service Adjustments (Electronic Controls, cont.)

Vertical Linearity adjustment

Serviceman DAC Adjustment (D3)

Preparation:

1. Apply a crosshatch pattern.

Procedure:

1. Adjust **D3 Vertical linearity** so that distance **A = B**. See Fig. 31.

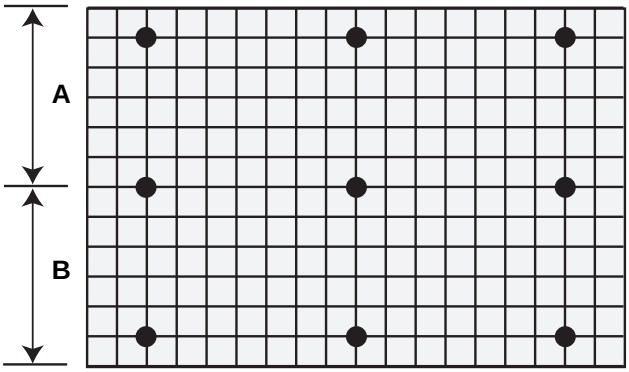


Figure 31. **Vertical Linearity**

To make a correlation of the Vertical Size from monoscope pattern, after Adjust **HORIZONTAL CENTER, HORIZONTAL WIDTH, VERTICAL POSITION AND SIZE** to obtain a complete round picture, mark the points as shown in Fig. 32 and use them as a reference in Linearity adjustment.

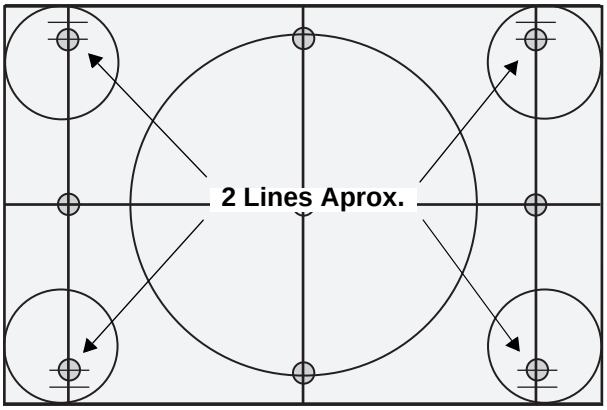


Figure 32. **Points for Correlation**.

Vertical Correction Adjustment

Serviceman DAC Adjustment (D2)

Preparation:

1. Apply a crosshatch pattern.
2. Adjust V-Size (**D1**) to obtain a regular size. (Confirm with monoscope pattern a complete round picture)

.

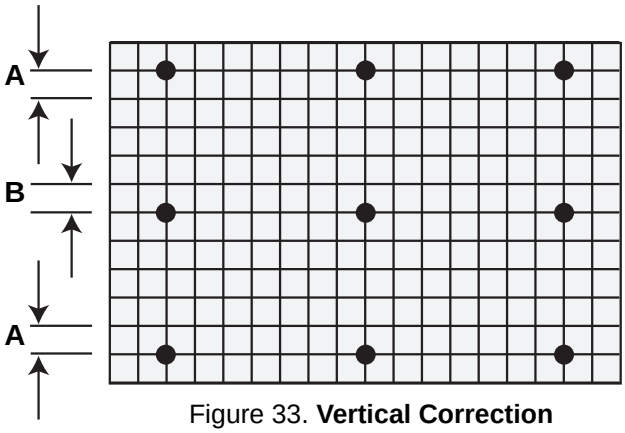


Figure 33. **Vertical Correction**

Procedure:

1. If **B-A < -1.5mm**. See Fig. 33.

- Increase the value in D2 V-S Correction one step.
- Adjust **D1 V-Size** to keep picture proportions (Confirm with monoscope pattern a complete round picture).
- Repeat above steps until **B-A ≤ 1.5mm.**

2. If **B-A > -1.5mm.** See Fig. 33.

- Decrease **D2** value one step.
- Adjust **D1 V-Size** to keep picture proportions (Confirm with monoscope pattern a complete round picture).
- Repeat above steps until **B-A ≤ 1.5mm**.

MTS Circuit Confirmation

Audio levels (MTS Circuit) are factory preset, confirm output levels. If are not within the range, replace the Tuner, refer to parts list in this manual for part number.

Output Level Confirmation

Preparation:

1. Connect an RMS meter with filter jig as shown in Fig. 34.

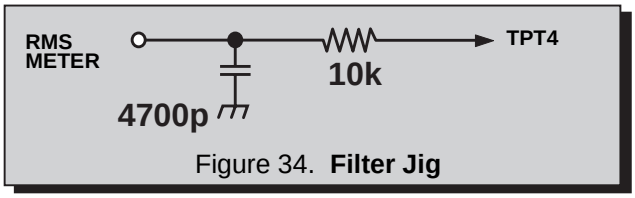


Figure 34. **Filter Jig**

2. Connect an RF signal generator to the RF antenna input.

Service Adjustments (Electronic Controls, cont.)

Procedure:

1. Apply the following signal from the RF signal generator:
   Video: 100 IRE flat field, 30% modulation.
   Audio: 300Hz, 100% modulation, monaural (70 ±5dB, 75Ω OPEN, P/S 10dB). Make sure that the 75μs pre-emphasis is OFF.
2. Confirm MTS Output level on TPT4 on the RMS is **530 ± 20.0mV rms**.

Stereo Separation Confirmation

Preparation:

1. Connect an RF signal generator to the RF antenna input.
2. Connect the scope to TPT3 for Right output.
3. Connect the scope to TPT4 for Left output

Procedure:

1. Select Stereo Mode in Audio menu
2. Apply the following signal from the RF signal generator:
   Video: 100 IRE flat field, 30% modulation.
   Audio: 300Hz, 30% modulation, stereo (left only) (70 ±5dB, 75Ω OPEN, P/S 10dB).
3. Confirm MTS stereo separation between Left and Right is minimum 20db.
4. Apply the following signal from the RF signal generator:
   Video: 100 IRE flat field, 30% modulation.
   Audio: 3KHz, 30% modulation, stereo (left only) (70 ±5dB, 75Ω OPEN, P/S 10dB).
5. Confirm MTS stereo separation between Left and Right is minimum 20db.

Audio Signal Path Block Diagram

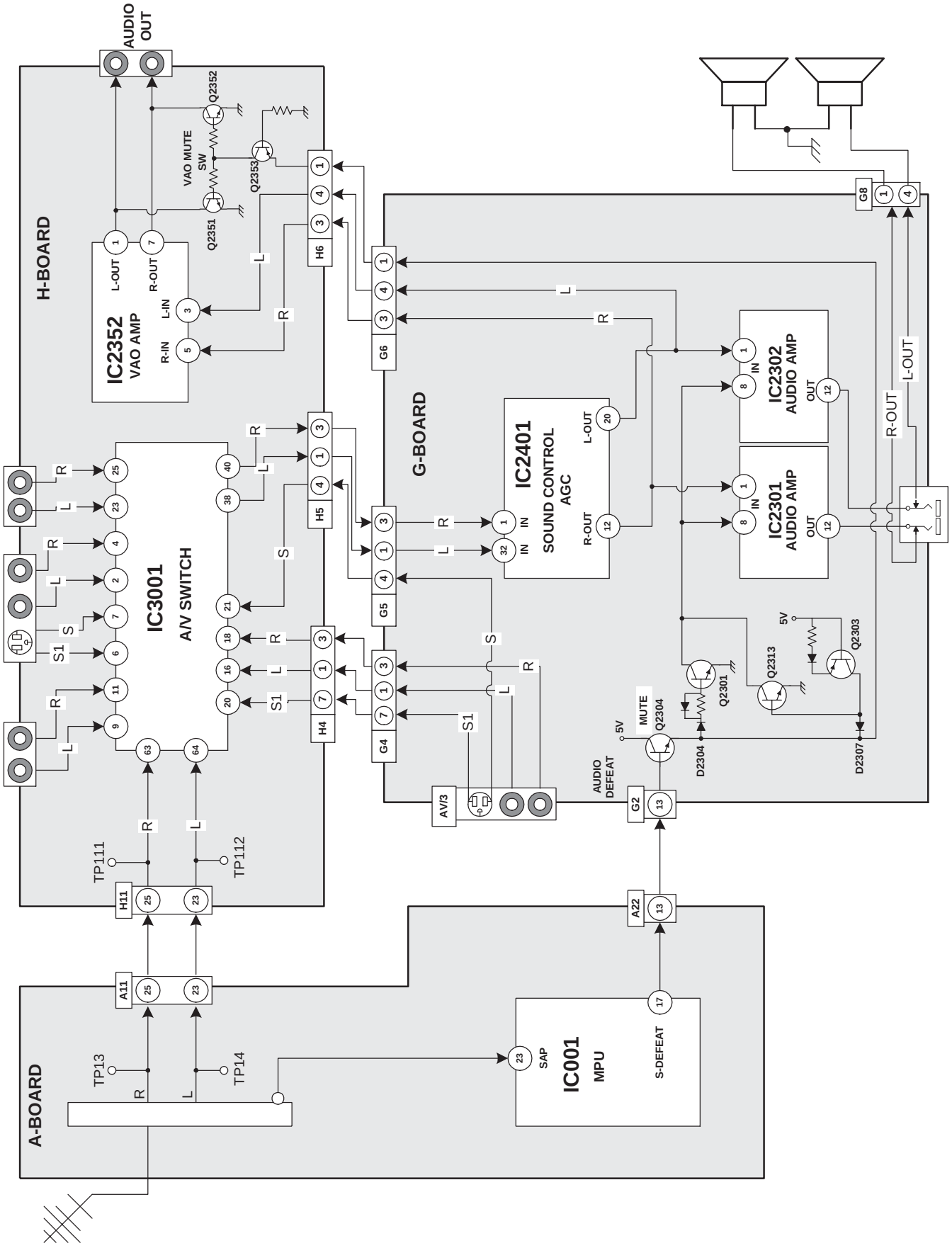


Figure 35. Audio Signal Path Block Diagram.

Video-Chroma Signal Path Block Diagram

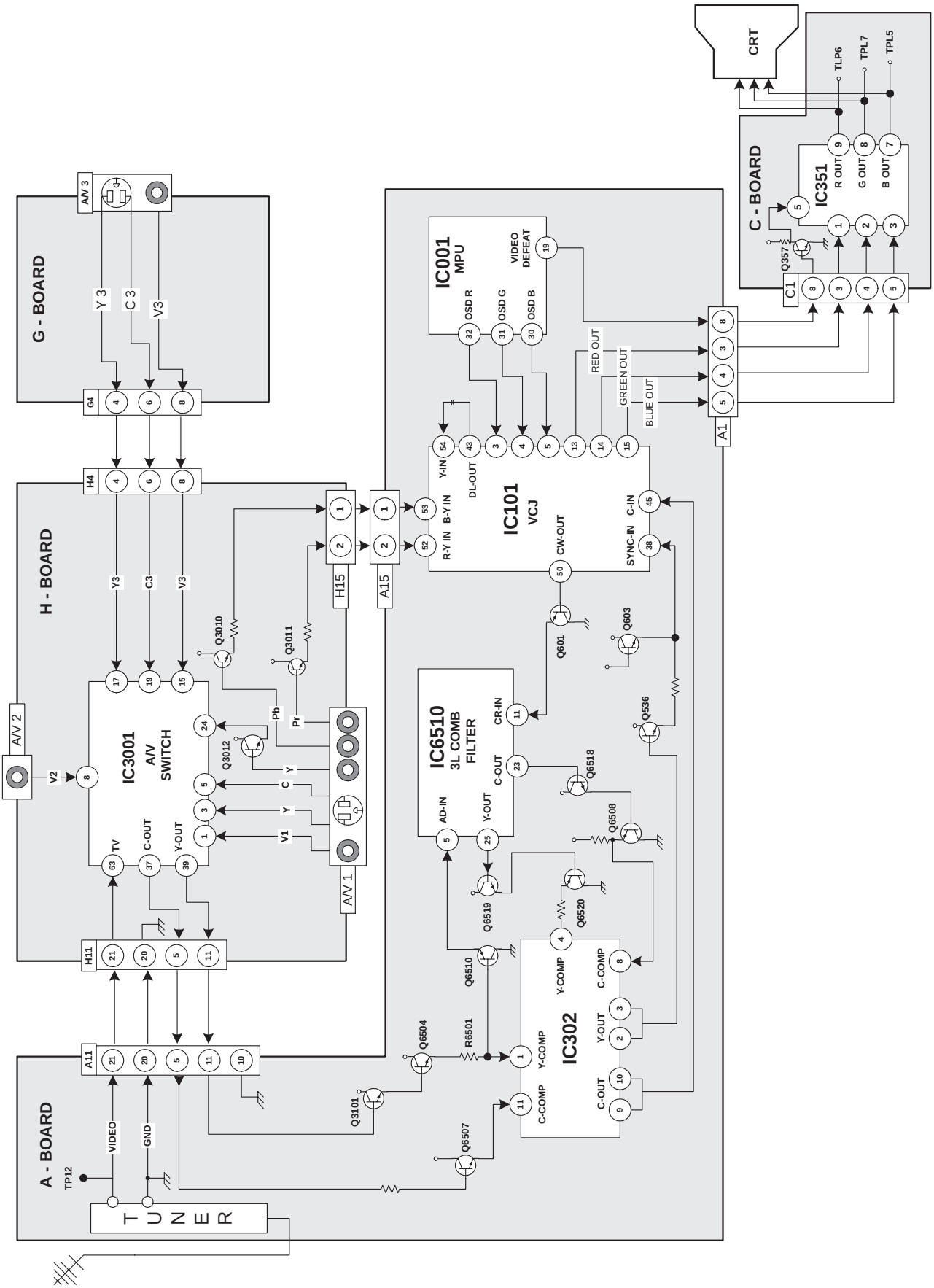


Figure 36. Video-Chroma Signal Path Block Diagram.

IC001 MPU
IN/OUT Pins and Functions

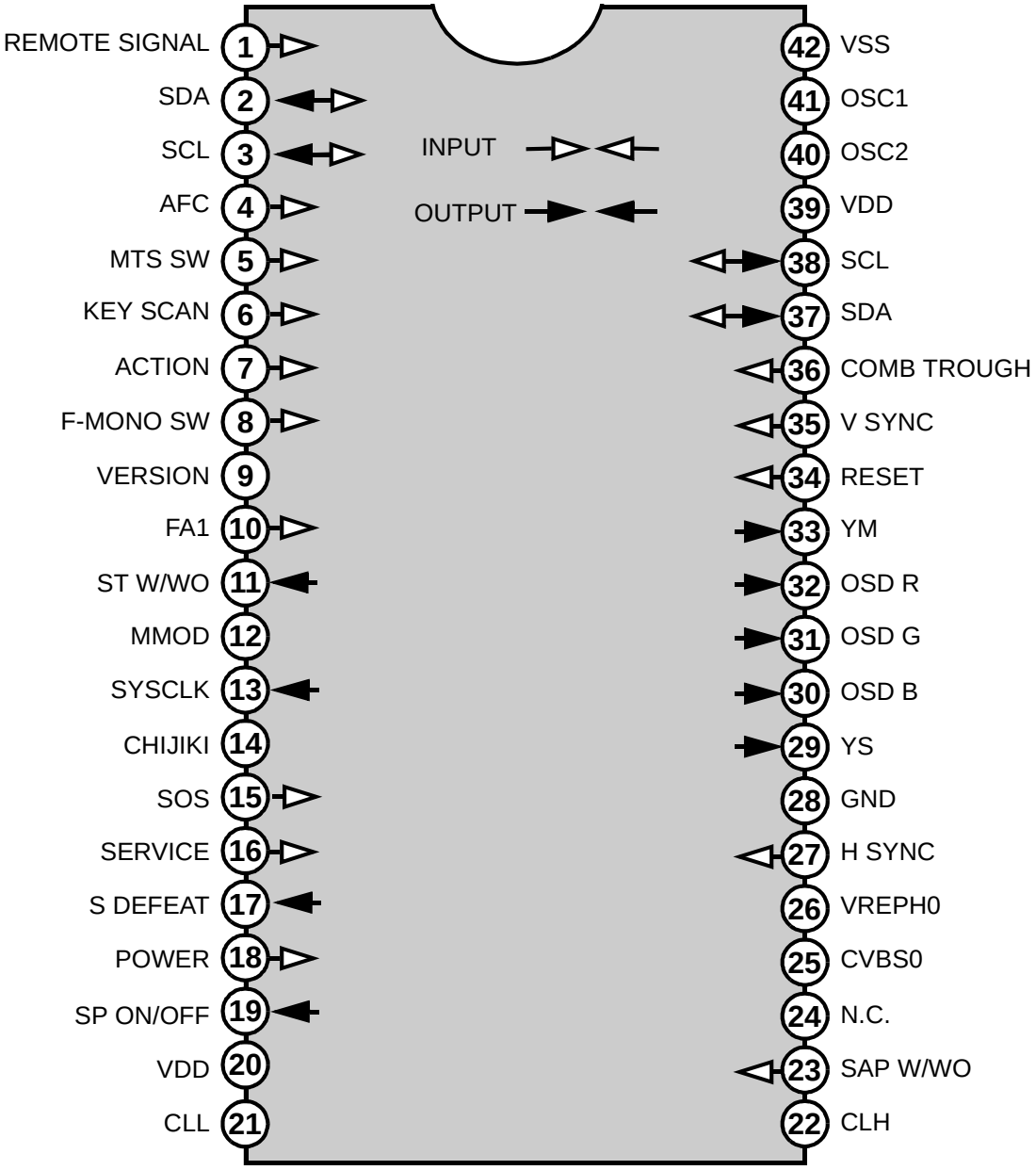


Figure 37. MPU IN/OUT Pins and Functions.

IC101 VCJ
IN/OUT Pins and Functions

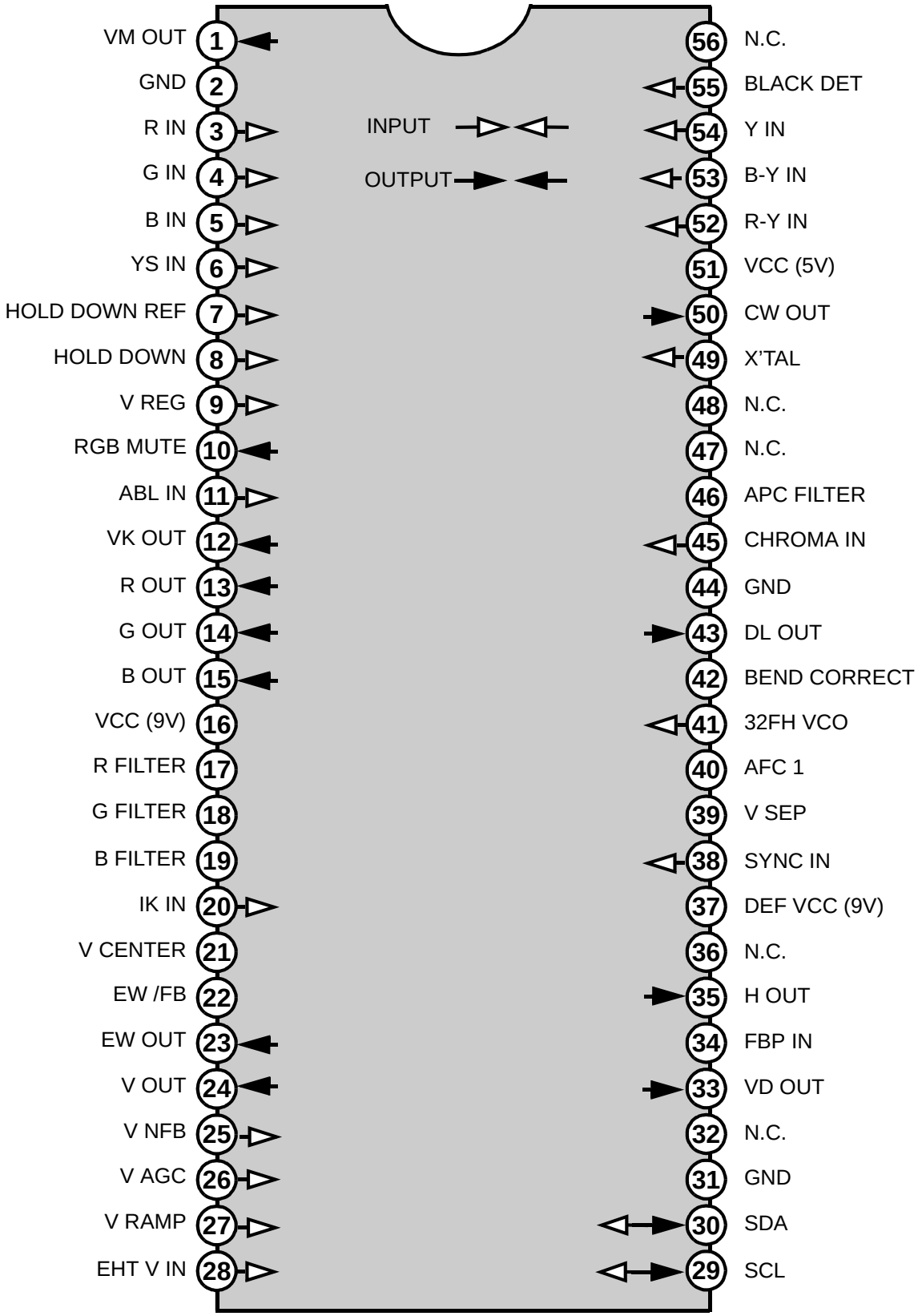


Figure 38. VCJ IN/OUT Pins and Functions.

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
	CAPACITORS	
C002	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C006	ECA1HM100	CAP,E 10UF/50V
C016	ECA1HM010	CAP,E 1.0UF/50V
C018	ECJ2VC1H101J	CAP,C 100PF-J-50V
C019	ECJ2VC1H220J	CAP,C 22PF-J-50V
C020	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C021	ECJ2VC1H101J	CAP,C 100PF-J-50V
C022	ECJ2VC1H220J	CAP,C 22PF-J-50V
C023	ECA1HM010	CAP,E 1.0UF/50V
C026	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C030	ECA0JM102	CAP,E 1000UF/6.3V
C033	ECJ2VF1H104Z	CAP,C .1UF-Z-50V
C034	ECA1CM101	CAP,E 100UF/16V
C036	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C038	ECA0JM102	CAP,E 1000UF/6.3V
C040	ECA1HM4R7	CAP,E 4.7UF/50V
C041	ECA1HMR22	CAP,E .22UF/50V
C042	ECA1HM2R2	CAP,E 2.2UF/50V
C043	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C044	ECKF1H103ZF	CAP,C .01UF-Z-50V
C045	ECA1VM470	CAP,E 47UF/35V
C046	ECA1CM470	CAP,E 47UF/16V
C047	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C048	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C049	ECA1CM101	CAP,E 100UF/16V
C050	ECA1CM101	CAP,E 100UF/16V
C301	ECQB1H104JM	CAP,P .1UF-J-50V
C302	ECQB1H104JM	CAP,P .1UF-J-50V
C303	ECQB1H104JM	CAP,P .1UF-J-50V
C310	ECJ2VC1H390J	CAP,C 39PF-J-50V
C315	EEANA1E1R0B	CAP,E 1.0UF-25V
C351	TACCV470T50V	CAP,C 47PF/50V
C353	TACCV330T50V	CAP,C 33PF/50V
C358	TACCW101T50V	CAP,C 100PF/50V
C359	ECQM4104KZ	CAP,P .1UF-K-400V

REF NO.	PART NO.	DESCRIPTION
C368	ECQV1H224JZ	CAP,P .22UF-J-50V
C370	ECKD3D102KB	CAP,C .001UF-K-2KV
C371	ECEA1HN010U	CAP,E 1UF/50V
C373	ECA2EHG100B	CAP,E 10UF-250V
C377	ECA1CM221	CAP,E 220UF/16V
C401	ECQB1H104JM	CAP,P .1UF-J-50V
C402	ECJ2VB1C104K	CAP,C .1UF-K-16V
C403	ECA1HM010	CAP,E 1.0UF/50V
C404	ECSF1EE105	CAP,T 1.0UF/25V
C405	ECA1HM220	CAP,E 22UF/50V
C407	ECJ2VB1H102K	CAP,C .001UF-K-50V
C453	EEUNA1E220B	CAP,E 22UF-25V
C454	ECA1HHG221B	CAP,E 220UF-50V
C456	ECQB1104JF	CAP,P .10UF-J-100V
C458	ECKF1H221KB	CAP,C 220PF-K-50V
C459	ECQB1224KF	CAP,P .22UF-K-100V
C460	ECA1VM221	CAP,E 220UF/35V
C461	ECA1VM470	CAP,E 47UF/35V
C462	ECA1VM221	CAP,E 220UF/35V
C463	ECQB1H103JM	CAP,P .01UF-J-50V
C465	ECA1CM101	CAP,E 100UF/16V
C470	ECQB1H104JM	CAP,P .1UF-J-50V
C471	ECQB1H104JM	CAP,P .1UF-J-50V
C491	ECKD2H471KB	CAP,C 470PF-K-500V
C493	ECKD2H471KB	CAP,C 470PF-K-500V
C495	ECQB1H683JM	CAP,P .068UF-J-50V
C497	ECA1EM102	CAP,E 1000UF/25V
C498	ECA1EM102	CAP,E 1000UF/25V
C511	ECKD2H271KB	CAP,C 270PF-K-500V
C512	ECKD2H152KB	CAP,C .0015UF-K-500V
C535	ECJ2VC1H120J	CAP,C 12PF-J-50V
C550	ECA160V33UE	CAP,E 33UF/160V
C551	**ECWH12H103JS**	**CAP,P .01UF-J-1.2KV**
C552	**ECQM6333JZ**	**CAP,P .063UF-J-100V**
C553	**ECWF2754JBB**	**CAP,M .27UF-J-200V**
C554	**ECKD3D102KB**	**CAP,C .001UF-K-2KV**

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
C555	ECA160V33UE	CAP,E 33UF/160V
C556	**ECWH20152JVY**	**CAP,P 1500PF-J-2KV**
C557	ECA1HM100	CAP,E 10UF/50V
C558	**ECKD3D561KB**	**CAP,C 560PF-K-2KV**
C559	ECKD3D681KB	CAP,C 680PF-K-2KV
C561	ECQB1H273JM	CAP,M .27UF-J-50V
C562	**ECKD3D102JB**	**CAP,C .001UF-J-2KV**
C563	**ECWH16332JVY**	**CAP,P 3300PF-J-1.5KV**
C569	**ECWF2394JBB**	**CAP,P .39UF-J-200V**
C570	ECA2EM220	CAP,E 22UF-250V
C571	ECKD2H102KB	CAP,C .001UF-K-500V
C572	**ECWF2334JBB**	**CAP,P .33UF-J-200V**
C573	ECQE2474KF	CAP,P .47UF-K-250V
C580	**ECA1HM4R7**	**CAP,E 4.7UF/50V**
C593	ECEA1HNR47U	CAP,E .47UF-50V
C594	ECQB1H104JM	CAP,P .1UF-J-50V
C595	ECEA1EN100U	CAP,E 10UF-25V
C601	ECA1CM471	CAP,E 470UF/16V
C602	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C603	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C604	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C605	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C606	ECQB1H104JM	CAP,P .1UF-J-50V
C607	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C614	ECQB1H104JM	CAP,P .1UF-J-50V
C615	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C616	ECQB1H104JM	CAP,P .1UF-J-50V
C617	ECQB1H222JM	CAP,P 2200PF-J-50V
C618	ECA1HM010	CAP,E 1.0UF/50V
C619	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C620	ECQB1H223JM	CAP,P .022UF-J-50V
C621	ECA1HMR22	CAP,E .22UF/50V
C623	ECA1HM010	CAP,E 1.0UF/50V
C624	ECJ2VC1H180J	CAP,C 18PF-J-50V
C625	ECA1HM2R2	CAP,E 2.2UF/50V
C626	ECQB1H273JM	CAP,M .27UF-J-50V

REF NO.	PART NO.	DESCRIPTION
C627	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C628	ECJ2VC1H151J	CAP,C 150PF-J-50V
C629	ECA1CM221	CAP,E 220UF/16V
C630	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C631	ECA1CM221	CAP,E 220UF/16V
C632	ECJ2VB1H103J	CAP,C .10UF-J-50V
C633	ECA1CM101	CAP,E 100UF/16V
C634	ECA1HM100	CAP,E 10UF/50V
C640	ECQB1H104JM	CAP,P .1UF-J-50V
C641	ECA1HM100	CAP,E 10UF/50V
C642	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C701	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C741	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C750	TACCW181T50V	CAP,C 180PF/50V
C751	ECQE1335KF	CAP,P 3.3UF-K-100V
C752	ECA1VM470	CAP,E 47UF/35V
C753	ECQB1H222JM	CAP,P .22UF-J-50V
C754	TACCW332T50V	CAP,C .0033UF/50V
C755	ECQB1H273JM	CAP,M .27UF-J-50V
C756	ECKD2H332KB	CAP,C .0033UF-K-500V
C757	ECQB1H682JM	CAP,P 6800PF-J-50V
C763	ECKD3A121KB	CAP,C 120PF-K-1KV
C801	**ECQU2A474MV**	**CAP,P .47UF-M-250V**
C802	**ECQU2A473MN**	**CAP,P .047UF-M-250VAC**
C804	**ECQU2A473MN**	**CAP,P .047UF-M-250VAC**
C805	**ECKD2H472PU**	**CAP,C .0047UF-P-500V**
C806	**ECKD2H472PU**	**CAP,C .0047UF-P-500V**
C807	**ECKD2H472PU**	**CAP,C .0047UF-P-500V**
C810	**EC0S2DA561BB**	**CAP,E 560PF-200V**
C814	ECA1VHG101B	CAP,E 100UF-35V
C819	ECKD3D222KB	CAP,C .0022UF-K-2KV
C821	TACCW821T50V	CAP,C 820PF/50V
C823	ECA1CHG101B	CAP,E 100UF-16V
C824	**ECKCNB222ME**	**CAP,C .0022UF-M-250V**
C825	ECQB1H272JM	CAP,P 2700PF-J-50V
C827	**ECKCNB222ME**	**CAP,C .0022UF-M-250V**

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
C828	ECA1EM471	CAP,E 470UF/25V
C830	ECKD2H471KB	CAP,C 470PF-K-500V
C835	ECQB1H103JM	CAP,P .01UF-J-50V
C837	ECA1CHG332E	CAP,E 3300UF-16V
C849	**EC0S2DA221BB**	**CAP,E 220UF/200V**
C850	ECKD3A471KB	CAP,C 470PF-K-1KV
C851	ECA1CM471	CAP,E 470UF/16V
C860	ECA1CHG221B	CAP,E 220UF/16V
C879	ECA1HM010	CAP,E 1.0UF/50V
C881	ECA1EMH101B	CAP,E 100UF-25V
C882	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C883	ECA1CHG221B	CAP,E 220UF/16V
C888	ECA1CHG471B	CAP,E 470UF-16V
C889	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C891	ECA1HHG100B	CAP,E 10UF/50V
C904	ECKF1H103ZF	CAP,C .01UF-Z-50V
C911	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C912	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C913	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C914	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C915	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C916	ECA1CM101	CAP,E 100UF/16V
C917	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C921	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C923	ECJ2VC1H680J	CAP,C 68PF-J-50V
C952	ECA1HM100	CAP,E 10UF/50V
C953	ECKF1H103ZF	CAP,C .01UF-Z-50V
C958	ECA2CM470	CAP,E 47UF-160V
C959	ECKD2H103ZF	CAP,C .01UF-Z-500V
C960	ECCD2H151J	CAP,C 150PF-J-500V
C961	ECA2AM100	CAP,E 10UF-100V
C962	ECKD2H103ZF	CAP,C .01UF-Z-500V
C963	ECCF1H151J	CAP,C 150PF-J-50V
C964	ECA1CHG101B	CAP,E 100UF-16V
C966	ECA1CHG101B	CAP,E 100UF-16V
C967	ECA1CM221	CAP,E 220UF/16V

REF NO.	PART NO.	DESCRIPTION
C968	ECKF1H103ZF	CAP,C .01UF-Z-50V
C969	ECKF1H103ZF	CAP,C .01UF-Z-50V
C971	TACCW222T50V	CAP,C 2200PF/50V
C1051	TACCX103T50V	CAP,C .01UF/50V
C1052	ECA0JM102	CAP,E 1000UF/6.3V
C1056	ECA1CM470	CAP,E 47UF/16V
C1057	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C2301	ECA1HHG100B	CAP,E 10UF/50V
C2302	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C2303	ECA1EHG101B	CAP,E 100UF-25V
C2304	ECA1HM100	CAP,E 10UF/50V
C2305	ECA1EHG222E	CAP,E 2200UF/25V
C2306	ECA1EHG471B	CAP,E 470UF-25V
C2307	ECJ2VF1H683Z	CAP,C .068UF-Z-50V
C2309	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C2310	ECA1CM101	CAP,E 100UF/16V
C2311	ECA1HHG100B	CAP,E 10UF/50V
C2312	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C2313	ECA1EHG101B	CAP,E 100UF-25V
C2314	ECA1HM100	CAP,E 10UF/50V
C2315	ECA1EHG222E	CAP,E 2200UF/25V
C2316	ECA1EHG471B	CAP,E 470UF-25V
C2317	ECJ2VF1H683Z	CAP,C .068UF-Z-50V
C2319	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C2320	ECA1CM470	CAP,E 47UF/16V
C2322	ECA1VM101	CAP,E 100UF/35V
C2342	ECJ2VB1H102K	CAP,C .001UF-K-50V
C2343	ECJ2VB1H102K	CAP,C .001UF-K-50V
C2347	ECA1HM470	CAP,E 47UF/50V
C2348	ECA1HM470	CAP,E 47UF/50V
C2349	ECA1VHG470B	CAP,E 47UF-35V
C2350	ECA1VHG470B	CAP,E 47UF-35V
C2376	ECA1HM010	CAP,E 1.0UF/50V
C2377	ECA1HM010	CAP,E 1.0UF/50V
C2378	ECA1HM100	CAP,E 10UF/50V
C2379	ECA1HM100	CAP,E 10UF/50V

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
C2380	ECA1HM010	CAP,E 1.0UF/50V
C2381	ECA1HM010	CAP,E 1.0UF/50V
C2402	ECJ2VB1H393K	CAP,C .039UF-K-50V
C2404	ECJ2VB1H223K	CAP,C .022UF-K-50V
C2405	ECA1HM010	CAP,E 1.0UF/50V
C2412	ECJ2VB1H562K	CAP,C .0056UF-K-50V
C2413	ECA1HM010	CAP,E 1.0UF/50V
C2420	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C2421	ECA1CM102	CAP,E 1000UF/16V
C2424	EEANA1E1R0B	CAP,E 1.0UF-25V
C2425	EEANA1E1R0B	CAP,E 1.0UF-25V
C2427	ECA1HM100	CAP,E 10UF/50V
C2428	ECA1HM4R7	CAP,E 4.7UF/50V
C2429	ECA1HM4R7	CAP,E 4.7UF/50V
C2430	ECA1HM4R7	CAP,E 4.7UF/50V
C2431	ECA1CM471	CAP,E 470UF/16V
C2432	ECJ2VB1E104K	CAP,C .10UF-K-25V
C2433	ECQB1H683JM	CAP,P .068UF-J-50V
C2434	ECA1HM4R7	CAP,E 4.7UF/50V
C2435	ECA1HM010	CAP,E 1.0UF/50V
C2436	ECQB1H683JM	CAP,P .068UF-J-50V
C2437	ECJ2VC1H102J	CAP,C .001UF-J-50V
C2439	ECJ2VC1H102J	CAP,C .001UF-J-50V
C2441	ECA1HM010	CAP,E 1.0UF/50V
C2442	ECA1HM010	CAP,E 1.0UF/50V
C2449	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C2801	ECKD3A471KB	CAP,C 470PF-K-1KV
C2802	ECA1VHG102B	CAP,E 1000UF-35V
C3006	ECEA1HKA010	CAP,E 1.0UF/50V
C3007	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V
C3008	ECEA1HKA010	CAP,E 1.0UF/50V
C3013	ECEA1HKA010	CAP,E 1.0UF/50V
C3015	ECEA1HKA010	CAP,E 1.0UF/50V
C3016	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C3017	ECEA1HKA010	CAP,E 1.0UF/50V
C3020	ECJ2VB1H102K	CAP,C .001UF-K-50V

REF NO.	PART NO.	DESCRIPTION
C3021	ECEA1HKA010	CAP,E 1.0UF/50V
C3022	ECEA1HKA010	CAP,E 1.0UF/50V
C3023	ECEA1HKA010	CAP,E 1.0UF/50V
C3024	ECJ2VB1H102K	CAP,C .001UF-K-50V
C3025	ECJ2VB1H102K	CAP,C .001UF-K-50V
C3026	ECJ2VB1H102K	CAP,C .001UF-K-50V
C3029	ECJ2VB1H102K	CAP,C .001UF-K-50V
C3030	ECJ2VB1H102K	CAP,C .001UF-K-50V
C3031	ECJ2VB1H102K	CAP,C .001UF-K-50V
C3034	ECA1EM471	CAP,E 470UF/25V
C3036	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C3039	ECEA1CKA470	CAP,E 47UF/16V
C3041	ECJ2VB1H102K	CAP,C .001UF-K-50V
C3042	ECJ2VB1H102K	CAP,C .001UF-K-50V
C3043	ECJ2YB1A105K	CAP,C 1.0UF-K-125V
C3044	ECJ2VB1H102K	CAP,C .001UF-K-50V
C3046	ECJ2VB1H102K	CAP,C .001UF-K-50V
C3048	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V
C3049	ECJ2YB1A105K	CAP,C 1.0UF-K-125V
C3050	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V
C3056	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V
C3070	ECJ2YB1A105K	CAP,C 1.0UF-K-125V
C3071	ECJ2YB1A105K	CAP,C 1.0UF-K-125V
C3072	ECJ2YB1A105K	CAP,C 1.0UF-K-125V
C3073	ECA1VM470	CAP,E 47UF/35V
C3083	ECJ2YB1A105K	CAP,C 1.0UF-K-125V
C3084	ECJ2YB1A105K	CAP,C 1.0UF-K-125V
C3094	ECEA1HKA010	CAP,E 1.0UF/50V
C3095	ECEA1HKA010	CAP,E 1.0UF/50V
C3096	ECEA1HKA010	CAP,E 1.0UF/50V
C3224	ECA1VM470	CAP,E 47UF/35V
C3225	ECA1VM470	CAP,E 47UF/35V
C3226	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C3227	ECJ2VF1C105Z	CAP,C 1.0UF-Z-16V
C4801	ECA1HM4R7	CAP,E 4.7UF/50V
C4803	ECQV1H334JM	CAP,P .33UF-J-50V

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
C4804	ECQV1H334JM	CAP,P .33UF-J-50V
C4805	ECA1VM470	CAP,E 47UF/35V
C4806	ECA1HM4R7	CAP,E 4.7UF/50V
C4808	ECA1HM330	CAP,E 33UF/50V
C6501	ECA1HM0R1	CAP,E 0.1UF/50V
C6502	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6503	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6504	ECA1HM0R1	CAP,E 0.1UF/50V
C6505	ECA1HM100	CAP,E 10UF/50V
C6506	ECJ2VC1H050C	CAP,C 5PF-C-50V
C6510	ECJ2VC1H390J	CAP,C 39PF-J-50V
C6513	ECJ2VC1H050C	CAP,C 5PF-C-50V
C6514	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6515	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6518	ECJ2VC1H270J	CAP,C 27PF-J-50V
C6520	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6522	ECA0JM331	CAP,E 330UF/6.3V
C6523	ECA1CM101	CAP,E 100UF/16V
C6524	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6525	ECJ2VC1H470J	CAP,C 47PF-J-50V
C6526	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6527	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6528	ECJ2VC1H181J	CAP,C 180PF-J-50V
C6529	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6530	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6531	ECA1HM100	CAP,E 10UF/50V
C6532	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6533	ECJ2VB1H472K	CAP,C .0047UF-K-50V
C6534	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6535	ECEA1HNR47U	CAP,E .47UF-50V
C6536	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6537	ECA1HM100	CAP,E 10UF/50V
C6538	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6539	ECJ2VF1H103Z	CAP,C .01UF-Z-50V
C6540	ECJ2VC1H101J	CAP,C 100PF-J-50V
C6541	ECJ2VC1H270J	CAP,C 27PF-J-50V

REF NO.	PART NO.	DESCRIPTION
	DIODES	
D001	MA4039M	DIODE, ZENER
D002	MA4039M	DIODE, ZENER
D005	MA165	DIODE
D014	MA165	DIODE
D015	MA165	DIODE
D022	MA4300M	DIODE
D023	MA165	DIODE
D354	MA165	DIODE
D355	MA165	DIODE
D356	MA165	DIODE
D357	MA4150M	DIODE
D358	MA165	DIODE
D359	MA4150M	DIODE
D360	ERA22-04	DIODE, ZENER
D361	ERA22-04	DIODE, ZENER
D362	ERA22-04	DIODE, ZENER
D375	MA165	DIODE
D451	ERA15-02	DIODE
D452	MA165	DIODE
D455	MA165	DIODE
D456	MA165	DIODE
D457	MA165	DIODE
D459	MA165	DIODE
D490	D1NL40V70	DIODE
D491	D1NL40V70	DIODE
D551	**ERD07-15E**	**DIODE**
D552	**RU3NLFA1**	**DIODE**
D553	**MA4062L**	**DIODE**
D554	MA4270M	DIODE
D555	MA165	DIODE
D556	MA4360H	DIODE, ZENER
D570	D1NL40V70	DIODE
D580	D1NL40V70	DIODE
D596	MA165	DIODE
D601	MA4056H	DIODE, ZENER

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
D740	MA165	DIODE
D741	MA165	DIODE
D742	MA165	DIODE
D743	MA165	DIODE
D753	AU01Z	DIODE
D803	**TRPW5B0M050D**	**THERMISTOR**
D814	**TMPG10G3**	**DIODE**
D815	ERA18-02	DIODE
D816	ERA18-02	DIODE
D817	ERA18-02	DIODE
D818	ERA18-02	DIODE
D820	ERA15-01	DIODE
D821	ERA15-01	DIODE
D822	ERA15-01	DIODE
D823	ERA15-01	DIODE
D834	MA165	DIODE
D835	MA165	DIODE
D836	MA4180M	DIODE, ZENER
D838	MA4039M	DIODE
D839	MA165	DIODE
D841	RN2ZLFA1	DIODE
D845	MA165	DIODE
D850	**RU30ALFS1**	**DIODE, RECTIFIER**
D858	AU02Z	DIODE
D1001	LN21RCPH	DIODE
D2302	MA165	DIODE
D2303	MA165	DIODE
D2304	MA165	DIODE
D2306	MA165	DIODE
D2307	MA165	DIODE
D2801	ERB32-02E	DIODE
D3008	MA4150M	DIODE
D3009	MA4150M	DIODE
D3012	MA4150M	DIODE
D3015	MA4150M	DIODE
D3016	MA3110M	DIODE, ZENER

REF NO.	PART NO.	DESCRIPTION
D3017	MA3110M	DIODE, ZENER
D3018	MA3110M	DIODE, ZENER
D3019	MA3110M	DIODE, ZENER
D3020	MA3110M	DIODE, ZENER
D3021	MA3110M	DIODE, ZENER
D3022	MA3110M	DIODE, ZENER
D3023	MA3110M	DIODE, ZENER
D3024	MA3110M	DIODE, ZENER
D3025	MA3110M	DIODE, ZENER
D3026	MA3110M	DIODE, ZENER
D3027	MA3110M	DIODE, ZENER
D3028	MA3110M	DIODE, ZENER
D3029	MA3110M	DIODE, ZENER
D3030	MA3110M	DIODE, ZENER
D3031	MA3110M	DIODE, ZENER
D3032	MA3110M	DIODE, ZENER
D3033	MA3110M	DIODE, ZENER
D3044	MA3110M	DIODE, ZENER
D3210	MA3110M	DIODE, ZENER
D3211	MA3110M	DIODE, ZENER
D3213	MA3110M	DIODE, ZENER
D3214	MA3110M	DIODE, ZENER
D3215	MA3110M	DIODE, ZENER
D3216	MA3110M	DIODE, ZENER
D3217	MA3110M	DIODE, ZENER
D3218	MA3110M	DIODE, ZENER
FUSES		
F801	**XBA2A00101**	**FUSE, 6.3A 125V** ***CT-27SX10BM, CT-27SX10CBM***
F801	**XBA2C63TR0**	**FUSE, 250V-6.3A** ***CT-F2910XBM***
INTEGRATED CIRCUITS		
D801	**D3SB60**	**INT CKT**
IC001	MN101C46FTC1	INT CKT
IC002	TVR2AJ066	INT CKT
IC004	PQ1R33	INT CKT
IC005	PQ05RD1B	INT CKT

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
IC006	PST9128NR	INT CKT
IC101	**TA1310BN**	**INT CKT**
IC302	TC4066BFN	INT CKT
IC351	TDA6103Q-N3	INT CKT
IC451	LA78045	INT CKT
IC740	NJM2904MTE1	INT CKT
IC750	NJM4565L	INT CKT
IC801	**STRF6548NF53**	**INT CKT**
IC802	**SE139NLF4**	**ERROR AMP**
IC811	**PC817B**	**INT CKT**
IC821	PQ12RD1B	INT CKT
IC882	AN78M05	PLUS 5V AVR
IC891	PQ09RD1B	INT CKT
IC2301	LA4289N	INT CKT
IC2302	LA4289N	INT CKT
IC2352	BA15218N	INT CKT
IC2401	BH3865S	INT CKT
IC3001	CXA2079Q	INT CKT
IC4801	PUB4301	INT CKT
IC4802	AN6564	INT CKT
IC6501	TC90A53N	INT CKT
IC6502	AN78N05	INT CKT
RM001	PNA4701M02TV	INT CKT
COILS		
L001	EXCELSA35	FERRITE BEAD
L005	ELESN330JA	COIL, PEAKING 33UH
L006	TLUABTA100K	COIL, PEAKING 10UH
L007	TLUABTA100K	COIL, PEAKING 10UH
L008	EXCELDR25	FERRITE BEAD
L009	EXCELSA35	FERRITE BEAD
L012	TLUABTA100K	COIL, PEAKING 10UH
L013	TLUABTA100K	COIL, PEAKING 10UH
L014	ELESN330JA	COIL, PEAKING 33UH
L301	ELESN470JA	COIL, PEAKING 47UH
L302	ELESN120JA	COIL, PEAKING 12UH
L303	EXCELDR35	FERRITE BEAD

REF NO.	PART NO.	DESCRIPTION
L551	**TLH15696T**	**COIL**
L553	EXCELSA39	FERRITE BEAD
L556	ELC18B801E	COIL
L559	TLUADNB682K	COIL
L601	TLUABTA560K	COIL, PEAKING 56UH
L706	EXCELSA35T	FERRITE BEAD
L751	ELC18B801E	COIL
L752	TALL13N103JB	COIL
L801	**ELF21N024A**	**COIL**
L802	**ELF21N024A**	**COIL**
L805	EXCELSA35B	FERRITE BEAD
L818	EXCELSA35B	FERRITE BEAD
L822	EXCELSA35B	FERRITE BEAD
L850	EXCELSA39E	FERRITE BEAD
L851	EXCELSA39E	FERRITE BEAD
L852	TALL08T101KA	LINE FILTER
L951	EXCELSA24T	FERRITE BEAD
L953	EXCELSA24T	FERRITE BEAD
L954	EXCELSA24T	FERRITE BEAD
L955	EXCELSA24T	FERRITE BEAD
L2401	ELESN101JA	COIL, PEAKING 100UH
L2801	EXCELDR35	FERRITE BEAD
L2804	EXCELDR35	FERRITE BEAD
L6501	ELESN270JA	COIL, 27UH
L6504	ELESN101JA	COIL, PEAKING 100UH
L6505	ELESN330JA	COIL, PEAKING 33UH
L6507	ELESN101JA	COIL, PEAKING 100UH
L6512	ELESN101JA	COIL, PEAKING 100UH
L6513	ELESN101JA	COIL, PEAKING 100UH
L6514	ELESN330JA	COIL, PEAKING 33UH
L6520	ELESN150JA	COIL, PEAKING 15UH
TRANSISTORS		
Q005	2SD601ARTX	TRANSISTOR
Q007	2SD601ATX	TRANSISTOR
Q008	2SD601ARTX	TRANSISTOR
Q009	2SD601ARTX	TRANSISTOR

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
Q301	2SD601ATX	TRANSISTOR
Q302	2SD601ATX	TRANSISTOR
Q303	2SD601ARTX	TRANSISTOR
Q357	2SC3311ATA	TRANSISTOR
Q369	2SA1309ATA	TRANSISTOR
Q401	2SD601ATX	TRANSISTOR
Q451	2SC3311ATA	TRANSISTOR
Q480	2SA1309ATA	TRANSISTOR
Q501	2SC3941HTA	TRANSISTOR
Q536	2SD601ATX	TRANSISTOR
Q551	2SD2553306	TRANSISTOR
Q601	2SB709A	TRANSISTOR
Q602	2SC3941HTA	TRANSISTOR
Q603	2SD601ATX	TRANSISTOR
Q701	2SD601ATX	TRANSISTOR
Q751	2SK2146LB	TRANSISTOR
Q754	2SC3311ATA	TRANSISTOR
Q755	2SA1309ATA	TRANSISTOR
Q817	2SD601ATX	TRANSISTOR
Q854	2SA19610QAHW	TRANSISTOR
Q901	2SB709A	TRANSISTOR
Q902	2SB709A	TRANSISTOR
Q903	2SD601ATX	TRANSISTOR
Q904	2SB709A	TRANSISTOR
Q905	2SB709A	TRANSISTOR
Q906	2SD601ATX	TRANSISTOR
Q907	2SB709A	TRANSISTOR
Q908	2SD601ATX	TRANSISTOR
Q951	2SC3311ATA	TRANSISTOR
Q952	2SC3311ATA	TRANSISTOR
Q953	2SC1741RSTP	TRANSISTOR
Q954	2SB1030ATA	TRANSISTOR
Q955	2SB1569AF51	TRANSISTOR
Q956	2SD2400AF51	TRANSISTOR
Q957	2SA1309ATA	TRANSISTOR
Q958	2SC3311ATA	TRANSISTOR

REF NO.	PART NO.	DESCRIPTION
Q961	2SC3311ATA	TRANSISTOR
Q962	2SC3311ATA	TRANSISTOR
Q2301	2SD601ARTX	TRANSISTOR
Q2303	2SB709ARTX	TRANSISTOR
Q2304	2SD601ARTX	TRANSISTOR
Q2313	2SD601ARTX	TRANSISTOR
Q2351	2SD601ARTX	TRANSISTOR
Q2352	2SD601ARTX	TRANSISTOR
Q2353	2SB709ARTX	TRANSISTOR
Q3010	2SD601ATX	TRANSISTOR
Q3011	2SD601TX	TRANSISTOR
Q3012	2SD601ATX	TRANSISTOR
Q3101	2SD601ATX	TRANSISTOR
Q6504	2SD601ATX	TRANSISTOR
Q6507	2SD601ATX	TRANSISTOR
Q6508	2SB709A	TRANSISTOR
Q6510	2SB709A	TRANSISTOR
Q6518	2SD601ATX	TRANSISTOR
Q6519	2SD601ATX	TRANSISTOR
Q6520	2SB709A	TRANSISTOR
RELAYS		
RL801	**TSEH8007**	**RELAY**
RESISTORS		
R005	ERJ6GEYJ472	RES,M 4.7K-J-1/10
R007	ERDS2TJ102	RES,C 1K-J-1/4
R008	ERJ6GEYJ103	RES,M 10K-J-1/10
R009	ERJ6GEYJ102	RES,M 1K-J-1/10
R010	ERJ6GEYJ102	RES,M 1K-J-1/10
R011	ERJ6GEYJ103	RES,M 10K-J-1/10
R012	ERJ6GEYJ102	RES,M 1K-J-1/10
R014	ERJ6GEYJ103	RES,M 10K-J-1/10
R015	ERJ6GEYJ103	RES,M 10K-J-1/10
R016	ERJ6GEYJ103	RES,M 10K-J-1/10
R017	ERDS2TJ103	RES,C 10K-J-1/4
R018	ERDS2TJ103	RES,C 10K-J-1/4
R019	ERDS2TJ103	RES,C 10K-J-1/4

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
R020	ERJ6GEYJ101	RES,M 100-J-1/10
R021	ERJ6GEYJ103	RES,M 10K-J-1/10
R022	ERDS2TJ332	RES,C 3.3K-J-1/4
R023	ERJ6GEYJ332	RES,M 3.3K-J-1/10
R024	ERJ6GEYJ332	RES,M 3.3K-J-1/10
R025	ERJ6GEYJ123	RES,M 12K-J-1/10
R026	ERJ6GEYJ332	RES,M 3.3K-J-1/10
R027	ERJ6GEYJ102	RES,M 1K-J-1/10
R028	ERJ6GEYJ472	RES,M 4.7K-J-1/10
R029	ERJ6ENF1302	RES,M 13K-F-1/10W
R031	ERJ6GEYJ472	RES,M 4.7K-J-1/10
R032	ERJ6GEYJ102	RES,M 1K-J-1/10
R034	ERJ6GEYJ332	RES,M 3.3K-J-1/10
R035	ERJ6GEYJ332	RES,M 3.3K-J-1/10
R036	ERJ6GEYJ102	RES,M 1K-J-1/10
R037	ERJ6GEYJ103	RES,M 10K-J-1/10
R040	ERJ6GEYJ102	RES,M 1K-J-1/10
R044	ERJ6GEYJ103	RES,M 10K-J-1/10
R045	ERDS2TJ101	RES,C 100-J-1/4
R046	ERJ6GEYJ182	RES,M 1.8K-J-1/10
R048	ERJ6GEYJ562	RES,M 5.6K-J-1/10
R049	ERJ6GEYJ104	RES,M 100K-J-1/10
R051	ERJ6GEYJ102	RES,M 1K-J-1/10
R052	ERJ6GEYJ102	RES,M 1K-J-1/10
R053	ERJ6GEYJ102	RES,M 1K-J-1/10
R054	ERJ6GEYJ102	RES,M 1K-J-1/10
R055	ERDS2TJ102	RES,C 1K-J-1/4
R056	ERJ6GEYJ472	RES,M 4.7K-J-1/10
R060	ERJ6GEYJ333	RES,M 33K-J-1/10
R061	ERJ6GEYJ682	RES,M 6.8K-J-1/10
R062	ERJ6GEYJ102	RES,M 1K-J-1/10
R063	ERJ6GEYJ103	RES,M 10K-J-1/10
R064	ERJ6GEYJ103	RES,M 10K-J-1/10
R066	ERJ6GEYJ562	RES,M 5.6K-J-1/10
R069	ERJ6GEYJ103	RES,M 10K-J-1/10
R070	ERJ6GEYJ102	RES,M 1K-J-1/10

REF NO.	PART NO.	DESCRIPTION
R075	ERJ6GEYJ102	RES,M 1K-J-1/10
R077	ERJ6GEYJ103	RES,M 10K-J-1/10
R099	ERJ6GEYJ103	RES,M 10K-J-1/10
R301	ERJ6GEYJ103	RES,M 10K-J-1/10
R303	ERJ6GEYJ332	RES,M 3.3K-J-1/10
R305	ERDS2TJ331	RES,C 330-J-1/4
R306	ERJ6GEYJ562	RES,M 5.6K-J-1/10
R308	ERJ6GEYJ273	RES,M 27K-J-1/10
R309	ERJ6GEYJ333	RES,M 33K-J-1/10
R310	ERJ6GEYJ103	RES,M 10K-J-1/10
R351	ER0S2CKF9100	RES,M 910-F-1/4W
R352	ER0S2CKF9100	RES,M 910-F-1/4W
R353	ER0S2CKF9100	RES,M 910-F-1/4W
R354	ERDS2TJ621	RES,C 620-J-1/4
R355	ERDS2TJ621	RES,C 620-J-1/4
R356	ERDS2TJ621	RES,C 620-J-1/4
R357	ERDS2TJ102	RES,C 1K-J-1/4
R358	ERDS1TJ134	RES,C 130K-J-1/2W
R359	ERDS1TJ134	RES,C 130K-J-1/2W
R360	ERDS1TJ134	RES,C 130K-J-1/2W
R361	ER0S2CKF8451	RES,M 7.68K-F-1/4W
R362	ER0S2CKF1541	RES,M 1.54K-F-1/4W
R363	ERC12GK102	RES,S 1K-K-1/2
R364	ERC12GK102	RES,S 1K-K-1/2
R365	ERC12GK102	RES,S 1K-K-1/2
R367	ERDS1TJ104	RES,C 100K-J-1/2
R368	ER0S2CKF1402	RES,M 14K-F-1/4W
R369	ERDS2TJ102	RES,C 1K-J-1/4
R371	ERDS2TJ102	RES,C 1K-J-1/4
R372	ERDS2TJ102	RES,C 1K-J-1/4
R374	ERQ12AJ121	RES,F 120-J-1/2W
R383	ERDS2TJ222	RES,C 2.2K-J-1/4
R384	ERDS2TJ104	RES,C 100K-J-1/4
R385	ERDS2TJ102	RES,C 1K-J-1/4
R401	ERJ6GEYJ101	RES,M 100-J-1/10
R402	ERJ6GEYJ102	RES,M 1K-J-1/10

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
R403	ERDS2TJ125	RES,C 1.2MEG-J/1/4
R405	ERDS2TJ304	RES,C 300K-J-1/4
R407	ERDS2TJ304	RES,C 300K-J-1/4
R408	ERJ6ENF2492	RES,M 24.9K-F-1/10W
R409	ERJ6ENF1103	RES,M 110K-F-1/10W
R450	ERDS2TJ821	RES,C 820-J-1/4
R451	ERG2FJ331H	RES,M 330-J-2W
R452	ERDS1FJ6R8	RES,C 6.8-J-1/2W
R453	ER0S2CKF1202	RES,M 12K-F-1/4
R454	ERDS2TJ182	RES,C 1.8K-J-1/4
R455	ERDS2TJ512	RES,C 5.1K-J-1/4
R456	ERDS2TJ182	RES,C 1.8K-J-1/4
R457	ERDS2TJ112	RES,C 1.1K-J-1/4
R459	ERX1SJ1R2	RES,M 1.2-J-1W
R460	ER0S2CKF1002	RES,M 10K-F-1/4
R461	ER0S2CKF1501	RES,M 1.5K-F-1/4
R468	ERDS2TJ104	RES,C 100K-J-1/4
R469	ERDS2TJ101	RES,C 100-J-1/4
R470	ERDS2TJ562	RES,C 5.6K-J-1/4
R471	ERDS2TJ224	RES,C 220K-J-1/4
R472	ERDS2TJ123	RES,C 12K-J-1/4
R473	**ERDS1FJ1R0**	**RES,C 1.0-J-1/2**
R475	**ERDS1FJ1R0**	**RES,C 1.0-J-1/2**
R476	ERDS2TJ272	RES,C 2.7K-J-1/4
R480	ERDS2TJ392	RES,C 3.9K-J-1/4
R481	ERDS1FJ1R0	RES,C 1.0-J-1/2
R482	ERDS1FJ1R0	RES,C 1.0-J-1/2
R485	ERDS2TJ152	RES,C 1.5K-J-1/4
R486	ERDS2TJ473	RES,C 47K-J-1/4
R487	ERDS2TJ822	RES,C 8.2K-J-1/4
R489	ER0S2CKF1202	RES,M 12K-F-1/4
R490	ER0S2CKF5101	RES,M 5.1K-F-1/4
R491	ER0S2CKF1052	RES,M 10.5K-F-1/4W
R510	ERG2FJ332H	RES,M 3.30K-J-2W
R512	ERG3FJ222H	RES,M 2200-J-3W
R513	ERDS2TJ561	RES,C 560-J-1/4
R514	ERDS2TJ161	RES,C 160-J-1/4W
R524	ERG1FJS122D	RES,M 1200-J-1W
R538	ERJ6GEYJ102	RES,M 1K-J-1/10
R542	ERJ6GEYJ272	RES,M 2.7K-J-1/10
R546	ERJ6GEYJ561	RES,M 560-J-1/10
R550	ERJ6GEYJ682	RES,M 6.8K-J-1/10
R554	ERJ6GEYJ331	RES,M 330-J-1/10
R555	ERDS1TJ561	RES,C 560-J-1/2
R556	**ERQ1CKPR56**	**RES,F .56-K-1W**
R557	ERF10ZK2R7	RES,W 2.7-K-10W
R561	ERDS2TJ103	RES,C 10K-J-1/4
R562	ERDS2TJ272	RES,C 2.7K-J-1/4
R576	ERQ12AJ101	RES,F 100-J-1/2
R580	**ERD25FJ4R7**	**RES,C 4.7-J-1/4**
R581	**ER0S2CKF5491**	**RES,M 5.49K-F-1/4W**
R582	**ERJ6ENF1692**	**RES,M 16.9K-F-1/10**
R590	ERDS2TJ473	RES,C 47K-J-1/4
R594	ERJ6GEYJ104	RES,M 100K-J-1/10
R597	ER0S2CKF2202	RES,M 22K-F-1/4
R599	ERDS2TJ102	RES,C 1K-J-1/4
R601	ERDS2TJ152	RES,C 1.5K-J-1/4
R602	ERJ6GEYJ101	RES,M 100-J-1/10
R603	ERJ6GEYJ101	RES,M 100-J-1/10
R604	ERJ6GEYJ101	RES,M 100-J-1/10
R606	ERJ6GEYJ222	RES,M 2.2K-J-1/10
R607	ERJ6GEYJ391	RES,M 390-J-1/10
R608	ERJ6GEYJ333	RES,M 33K-J-1/10
R609	ERJ6GEYJ474	RES,M 470K-J-1/10
R610	ERDS2TJ622	RES,C 6.2K-J-1/4
R613	ERJ6GEYJ471	RES,M 470-J-1/10
R614	ERJ6GEYJ102	RES,M 1K-J-1/10
R615	ERQ14AJ4R7	RES,F 4.7-J-1/4
R616	ERDS2TJ102	RES,C 1K-J-1/4
R618	ERJ6GEYJ474	RES,M 470K-J-1/10
R619	ERJ6GEYJ563	RES,M 56K-J-1/10
R620	ERJ6GEYJ153	RES,M 15K-J-1/10

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
R622	ERJ6GEYJ155	RES,M 1.5MEG-J-1/10W
R701	ERDS2TJ122	RES,C 1.2K-J-1/4
R702	ERDS2TJ102	RES,C 1K-J-1/4
R703	ERJ6GEYJ472	RES,M 4.7K-J-1/10
R704	ERJ6GEYJ102	RES,M 1K-J-1/10
R705	ERDS2TJ472	RES,C 4.7K-J-1/4
R706	ERDS2TJ225	RES,C 2.2MEG-J-1/4
R707	ERDS2TJ225	RES,C 2.2MEG-J-1/4
R708	ERDS2TJ101	RES,C 100-J-1/4
R709	ERDS2TJ103	RES,C 10K-J-1/4
R710	ERDS2TJ103	RES,C 10K-J-1/4
R711	ERDS2TJ103	RES,C 10K-J-1/4
R712	ERDS2TJ222	RES,C 2.2K-J-1/4
R713	ERDS2TJ822	RES,C 8.2K-J-1/4
R714	ERDS1FJ102	RES,C 1K-J-1/2
R716	ERDS2TJ101	RES,C 100-J-1/4
R717	ERDS2TJ101	RES,C 100-J-1/4
R718	ERDS2TJ223	RES,C 22K-J-1/4
R740	ERJ6ENF6652	RES,M 66.5K-F-1/10
R741	ERJ6ENF4222	RES,M 42.2K-F-1/10W
R742	ERJ6ENF1202	RES,M 12K-F-1/10
R743	ERJ6ENF5602	RES,M 56K-F-1/10
R744	ERJ6ENF5602	RES,M 56K-F-1/10
R745	ERJ6ENF2002	RES,M 20K-F-1/10
R746	ERJ6GEYJ472	RES,M 4.7K-J-1/10
R747	ERJ6GEYJ103	RES,M 10K-J-1/10
R752	ERDS2TJ103	RES,C 10K-J-1/4
R753	ERDS1FJ102	RES,C 1K-J-1/2
R754	ERDS1TJ751	RES,C 750-J-1/2W
R756	ERG2FJ820H	RES,M 82-J-2W
R757	ERDS2TJ103	RES,C 10K-J-1/4
R758	ERDS2TJ331	RES,C 330-J-1/4
R801	**ERF15ZK1R2**	**RES,W 1.2-J-15W**
R805	ERDS2TJ102	RES,C 1K-J-1/4
R811	ERG2FJ473H	RES,M 47K-J-2W
R812	ERG2FJ820H	RES,M 82-J-2W

REF NO.	PART NO.	DESCRIPTION
R813	ERDS2TJ132	RES,C 1.3K-J-1/4
R815	ERDS1FJ681	RES,C 680-J-1/2
R816	ERX12SJR27	RES,M .27-J-1/2W
R817	ERX12SJR27	RES,M .27-J-1/2W
R819	ERX12SJR22	RES,M .22-J-1/2
R821	ERDS1FJ1R8	RES,C 1.8-J-1/2
R822	ERDS1FJ102	RES,C 1K-J-1/2
R823	ERDS2TJ103	RES,C 10K-J-1/4
R826	ERDS2TJ332	RES,C 3.3K-J-1/4
R829	ERDS1FJ1R2	RES,C 1.2-J-1/2
R830	ERDS2TJ180	RES,C 18-J-1/4
R832	**ERC12ZGM825**	**RES,S 8.2MEG-M-1/2**
R834	ERJ6GEYJ102	RES,M 1K-J-1/10
R835	ERQ14AJ101	RES,F 100-J-1/4
R836	ERJ6GEYJ473	RES,M 47K-J-1/10
R837	ERDS2TJ222	RES,C 2.2K-J-1/4
R843	ERDS2TJ122	RES,C 1.2K-J-1/4
R845	ERDS2TJ470	RES,C 47-J-1/4
R852	ERDS2TJ102	RES,C 1K-J-1/4
R854	ERDS2TJ913	RES,C 91K-J-1/4
R855	ERQ14AJW391E	RES,F 390-J-1/4W
R856	ERG1SJ273P	RES,M 27K-J-1W
R857	ERDS2TJ223	RES,C 22K-J-1/4
R858	ERDS2TJ272	RES,C 2.7K-J-1/4
R859	ERDS2TJ123	RES,C 12K-J-1/4
R868	ERDS2TJ821	RES,C 820-J-1/4
R891	ERG3FJS220H	RES,M 22-J-3W
R901	ERJ6GEYJ331	RES,M 330-J-1/10
R902	ERJ6GEYJ561	RES,M 560-J-1/10
R903	ERJ6GEYJ681	RES,M 680-J-1/10
R904	ERJ6GEYJ151	RES,M 150-J-1/10
R905	ERJ6GEYJ183	RES,M 18K-J-1/10
R906	ERJ6GEYJ103	RES,M 10K-J-1/10
R909	ERJ6GEYJ561	RES,M 560-J-1/10
R910	ERJ6GEYJ331	RES,M 330-J-1/10
R911	ERJ6GEYJ822	RES,M 8.2K-J-1/10

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
R912	ERJ6GEYJ104	RES,M 100K-J-1/10
R913	ERJ6GEYJ104	RES,M 100K-J-1/10
R914	ERJ6GEYJ104	RES,M 100K-J-1/10
R915	ERJ6GEYJ822	RES,M 8.2K-J-1/10
R917	ERJ6GEYJ101	RES,M 100-J-1/10
R918	ERJ6GEYJ331	RES,M 330-J-1/10
R919	ERJ6GEYJ561	RES,M 560-J-1/10
R922	ERDS2TJ331	RES,C 330-J-1/4
R923	ERJ6GEYJ101	RES,M 100-J-1/10
R924	ERJ6GEYJ473	RES,M 47K-J-1/10
R925	ERJ6GEYJ473	RES,M 47K-J-1/10
R926	ERJ6GEYJ751	RES,M 750-J-1/10
R927	ERJ6GEYJ162	RES,M 1.6K-J-1/10
R930	ERJ6GEYJ473	RES,M 47K-J-1/10
R931	ERJ6GEYJ272	RES,M 2.7K-J-1/10
R932	ERJ6GEYJ102	RES,M 1K-J-1/10
R933	ERJ6GEYJ751	RES,M 750-J-1/10
R951	ERDS2TJ821	RES,C 820-J-1/4
R952	ERDS2TJ223	RES,C 22K-J-1/4
R953	ERDS2TJ332	RES,C 3.3K-J-1/4
R954	ERDS2TJ431	RES,C 430-J-1/4
R956	ERDS2TJ121	RES,C 120-J-1/4
R958	ERDS2TJ391	RES,C 390-J-1/4
R959	ERDS2TJ101	RES,C 100-J-1/4
R960	ERQ14AJ100	RES,F 10-J-1/4
R961	ERQ1CJP331	RES,F 330-J-1W
R962	ERDS2TJ330	RES,C 33-J-1/4
R963	ERDS2TJ330	RES,C 33-J-1/4
R964	ERDS2TJ471	RES,C 470-J-1/4
R965	ERDS2TJ563	RES,C 56K-J-1/4
R966	ERDS1FJ471	RES,C 470-J-1/2
R967	ERDS2TJ563	RES,C 56K-J-1/4
R968	ERDS2TJ471	RES,C 470-J-1/4
R969	ERDS2TJ390	RES,C 39-J-1/4
R970	ERDS2TJ2R7	RES,C 2.7-J-1/4
R971	ERDS2TJ2R7	RES,C 2.7-J-1/4

REF NO.	PART NO.	DESCRIPTION
R972	ERDS2TJ390	RES,C 39-J-1/4
R973	ERDS2TJ101	RES,C 100-J-1/4
R974	ERDS2TJ333	RES,C 33K-J-1/4
R975	ERDS2TJ101	RES,C 100-J-1/4
R976	ERDS2TJ101	RES,C 100-J-1/4
R977	ERDS2TJ561	RES,C 560-J-1/4
R978	ERDS2TJ101	RES,C 100-J-1/4
R987	ERDS2TJ472	RES,C 4.7K-J-1/4
R988	ERDS2TJ331	RES,C 330-J-1/4
R989	ERDS2TJ682	RES,C 6.8K-J-1/4
R990	ERDS2TJ471	RES,C 470-J-1/4
R993	ERDS2TJ471	RES,C 470-J-1/4
R1051	ER0S2CKF1002	RES,M 10K-F-1/4
R1052	ERDS2TJ222	RES,C 2.2K-J-1/4
R1053	ERDS2TJ222	RES,C 2.2K-J-1/4
R1054	ERDS2TJ332	RES,C 3.3K-J-1/4
R1055	ERDS2TJ512	RES,C 5.1K-J-1/4
R1056	ERDS2TJ912	RES,C 9.1K-J-1/4
R1057	ERDS2TJ223	RES,C 22K-J-1/4
R1058	ERDS2TJ103	RES,C 10K-J-1/4
R1059	ERDS2TJ102	RES,C 1K-J-1/4
R1060	ERDS2TJ470	RES,C 47-J-1/4
R1061	ERDS2TJ102	RES,C 1K-J-1/4
R1062	ERDS2TJ102	RES,C 1.8K-J-1/4
R2301	ERJ6GEYJ562	RES,M 5.6K-J-1/10
R2302	ERJ6GEYJ4R7	RES,M 4.7-J-1/10
R2303	ERJ6GEYJ103	RES,M 10K-J-1/10
R2305	ERJ6GEYJ681	RES,M 680-J-1/10
R2307	ER0S2CKF1372	RES,M 13.7K-F-1/4W
R2308	ER0S2CKF5361	RES,M 5.36K-F-1/4W
R2309	ER0S2CKF1502	RES,M 15K-F-1/4
R2310	ERJ6GEYJ183	RES,M 18K-J-1/10
R2311	ERJ6GEYJ562	RES,M 5.6K-J-1/10
R2312	ERJ6GEYJ4R7	RES,M 4.7-J-1/10
R2313	ERJ6GEYJ472	RES,M 4.7K-J-1/10
R2314	ERJ6GEYJ103	RES,M 10K-J-1/10

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
R2315	ERJ6GEYJ681	RES,M 680-J-1/10
R2321	ERJ6GEYJ472	RES,M 4.7K-J-1/10
R2322	ERDS2TJ222	RES,C 2.2K-J-1/4
R2323	ERJ6GEYJ271	RES,M 270-J-1/10
R2324	ERJ6GEYJ102	RES,M 1K-J-1/10
R2325	ERJ6GEYJ223	RES,M 22K-J-1/10
R2326	ER0S2CKF1502	RES,M 15K-F-1/4
R2330	ERX1SJ1R0	RES,M 1.0-J-1W
R2331	ERX1SJ1R0	RES,M 1.0-J-1W
R2339	ERJ6GEYJ184	RES,M 180K-J-1/10
R2340	ERJ6GEYJ184	RES,M 180K-J-1/10
R2353	ERJ6GEYJ183	RES,M 18K-J-1/10
R2354	ERJ6GEYJ472	RES,M 4.7K-J-1/10
R2355	ERJ6GEYJ103	RES,M 10K-J-1/10
R2356	ERJ6GEYJ102	RES,M 1K-J-1/10
R2357	ERJ6GEYJ103	RES,M 10K-J-1/10
R2358	ERJ6GEYJ102	RES,M 1K-J-1/10
R2359	ERDS2TJ222	RES,C 2.2K-J-1/4
R2359	ERJ6GEYJ332	RES,M 3.3K-J-1/10
R2360	ERDS2TJ222	RES,C 2.2K-J-1/4
R2362	ERJ6GEYJ332	RES,M 3.3K-J-1/10
R2365	ERJ6GEYJ472	RES,M 4.7K-J-1/10
R2366	ERJ6GEYJ183	RES,M 18K-J-1/10
R2367	ERJ6GEYJ103	RES,M 10K-J-1/10
R2368	ERJ6GEYJ102	RES,M 1K-J-1/10
R2369	ERJ6GEYJ103	RES,M 10K-J-1/10
R2370	ERJ6GEYJ102	RES,M 1K-J-1/10
R2371	ERJ6GEYJ102	RES,M 1K-J-1/10
R2372	ERJ6GEYJ102	RES,M 1K-J-1/10
R2373	ERDS1TJ561	RES,C 560-J-1/2
R2373	ERJ6GEYJ223	RES,M 22K-J-1/10
R2374	ERDS1TJ561	RES,C 560-J-1/2
R2375	ERDS1TJ820	RES,C 82-J-1/2
R2380	ERDS1TJ820	RES,C 82-J-1/2
R2403	ERJ6GEYJ473	RES,M 47K-J-1/10
R2404	ERJ6GEYJ103	RES,M 10K-J-1/10

REF NO.	PART NO.	DESCRIPTION
R2407	ERJ6GEYJ103	RES,M 10K-J-1/10
R2427	ERJ6GEYJ472	RES,M 4.7K-J-1/10
R2429	ERJ6GEYJ123	RES,M 12K-J-1/10
R2430	ER0S2CKF2202	RES,M 22K-F-1/4
R2433	ERJ6GEYJ123	RES,M 12K-J-1/10
R2434	ERJ6ENF1602	RES,M 16K-F-1/4W
R2439	ERJ6GEYJ224	RES,M 220K-J-1/10
R2440	ERJ6GEYJ103	RES,M 10K-J-1/10
R2441	ERJ6GEYJ470	RES,M 47-J-1/10
R2443	ERJ6GEYJ470	RES,M 47-J-1/10
R2451	ERJ6GEYJ104	RES,M 100K-J-1/10
R3001	ERJ6GEYJ103	RES,M 10K-J-1/10
R3003	ERJ6GEYJ184	RES,M 180K-J-1/10
R3004	ERJ6GEYJ184	RES,M 180K-J-1/10
R3005	ERJ6GEYJ153	RES,M 15K-J-1/10
R3006	ERJ6GEYJ221	RES,M 220-J-1/10
R3007	ERJ6GEYJ184	RES,M 180K-J-1/10
R3008	ERJ6GEYJ184	RES,M 180K-J-1/10
R3009	ERJ6GEYJ102	RES,M 1K-J-1/10
R3010	ERJ6GEYJ102	RES,M 1K-J-1/10
R3013	ERJ6GEYJ221	RES,M 220-J-1/10
R3018	ERJ6GEYJ750	RES,M 75-J-1/10
R3019	ERJ6GEYJ331	RES,M 330-J-1/10
R3020	ERJ6GEYJ103	RES,M 10K-J-1/10
R3021	ERJ6GEYJ221	RES,M 220-J-1/10
R3022	ERJ6GEYJ750	RES,M 75-J-1/10
R3023	ERJ6GEYJ102	RES,M 1K-J-1/10
R3024	ERJ6GEYJ102	RES,M 1K-J-1/10
R3025	ERJ6GEYJ392	RES,M 3.9K-J-1/10
R3028	ERJ6GEYJ750	RES,M 75-J-1/10
R3029	ERJ6GEYJ221	RES,M 220-J-1/10
R3031	ERJ6GEYJ103	RES,M 10K-J-1/10
R3032	ERJ6GEYJ102	RES,M 1K-J-1/10
R3037	ERJ6GEYJ560	RES,M 56-J-1/10
R3038	ERJ6GEYJ560	RES,M 56-J-1/10
R3040	ERJ6GEYJ221	RES,M 220-J-1/10

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
R3042	ERJ6GEYJ102	RES,M 1K-J-1/10
R3043	ERJ6GEYJ221	RES,M 220-J-1/10
R3047	ERJ6GEYJ102	RES,M 1K-J-1/10
R3048	ERJ6GEYJ221	RES,M 220-J-1/10
R3053	ERJ6GEYJ102	RES,M 1K-J-1/10
R3062	ERJ6GEYJ221	RES,M 220-J-1/10
R3066	ERJ6GEYJ102	RES,M 1K-J-1/10
R3067	ERJ6GEYJ221	RES,M 220-J-1/10
R3068	ERJ6GEYJ102	RES,M 1K-J-1/10
R3071	ERJ6GEYJ750	RES,M 75-J-1/10
R3073	ERJ6GEYJ103	RES,M 10K-J-1/10
R3074	ERJ6GEYJ153	RES,M 15K-J-1/10
R3075	ERJ6GEYJ392	RES,M 3.9K-J-1/10
R3080	ERJ6GEYJ750	RES,M 75-J-1/10
R3081	ERJ6GEYJ153	RES,M 15K-J-1/10
R3082	ERJ6GEYJ103	RES,M 10K-J-1/10
R3083	ERJ6GEYJ392	RES,M 3.9K-J-1/10
R3086	ERJ6GEYJ750	RES,M 75-J-1/10
R3090	ERJ6GEYJ331	RES,M 330-J-1/10
R3091	ERJ6GEYJ331	RES,M 330-J-1/10
R3092	ERJ6GEYJ184	RES,M 180K-J-1/10
R3098	ERJ6GEYJ102	RES,M 1K-J-1/10
R3104	ERJ6GEYJ750	RES,M 75-J-1/10
R3106	ERJ6GEYJ184	RES,M 180K-J-1/10
R3109	ERJ6GEYJ331	RES,M 330-J-1/10
R3112	ERJ6GEYJ471	RES,M 470-J-1/10
R3179	ERJ6GEYJ750	RES,M 75-J-1/10
R3180	ERJ6GEYJ750	RES,M 75-J-1/10
R3181	ERJ6GEYJ750	RES,M 75-J-1/10
R3182	ERJ6GEYJ102	RES,M 1K-J-1/10
R4801	ERDS2TJ472	RES,C 4.7K-J-1/4
R4803	ERX12SJ2R7E	RES,M 2.7-J-1/2W
R4804	ERJ6GEYJ272	RES,M 2.7K-J-1/10
R4805	ERJ6ENF1331	RES,M 1.33K-F-1/10W
R4806	ERJ6ENF3320	RES,M 332-F-1/10W
R4807	ERJ6ENF1001	RES,M 1K-F-1/10

REF NO.	PART NO.	DESCRIPTION
R4808	ERJ6ENF3832	RES,M 38.3K-F-1/10W
R4809	ERJ6ENF9091	RES,M 9.09K-F-1/10W
R4810	ERJ6ENF2213	RES,M 221K-F-1/10W
R4811	ERJ6ENF6651	RES,M 6.65K-F-1/10W
R4812	ER0S2CKF5621	RES,M 5.62K-F-1/4W
R4815	ERDS1FJ180	RES,C 18-J-1/2
R6502	ERJ6GEYJ471	RES,M 470-J-1/10
R6503	ERJ6GEYJ102	RES,M 1K-J-1/10
R6504	ERJ6GEYJ104	RES,M 100K-J-1/10
R6505	ERJ6GEYJ512	RES,M 5.1K-J-1/10
R6506	ERJ6GEYJ103	RES,M 10K-J-1/10
R6507	ERJ6GEYJ514	RES,M 510K-J-1/10W
R6509	ERJ6GEYJ102	RES,M 1K-J-1/10
R6510	ERJ6GEYJ101	RES,M 100-J-1/10
R6511	ERJ6GEYJ471	RES,M 470-J-1/10
R6517	ERJ6GEYJ471	RES,M 470-J-1/10
R6518	ERJ6GEYJ102	RES,M 1K-J-1/10
R6519	ERJ6GEYJ822	RES,M 8.2K-J-1/10
R6521	ERJ6ENF3240	RES,M 324-F-1/10W
R6522	ERJ6GEYJ471	RES,M 470-J-1/10
R6523	ERJ6ENF3320	RES,M 332-F-1/10W
R6524	ERJ6GEYJ102	RES,M 1K-J-1/10
R6530	ERJ6GEYJ102	RES,M 1K-J-1/10
R6531	ERJ6ENF1131	RES,M 1.13K-F-1/10W
R6532	ERJ6GEYJ821	RES,M 820-J-1/10
R6533	ERJ6GEYJ471	RES,M 470-J-1/10
R6535	ERJ6GEYJ102	RES,M 1K-J-1/10
R6545	ERJ6GEYJ822	RES,M 8.2K-J-1/10
R6547	ERJ6GEYJ911	RES,M 910-J-1/10
R6548	ERJ6GEYJ821	RES,M 820-J-1/10
R6549	ERJ6GEYJ102	RES,M 1K-J-1/10
R6550	ERJ6GEYJ102	RES,M 1K-J-1/10
R6552	ERJ6GEYJ102	RES,M 1K-J-1/10
R6555	ERJ6GEYJ102	RES,M 1K-J-1/10
R6559	ERJ6GEYJ102	RES,M 1K-J-1/10
R6561	ERJ6GEYJ102	RES,M 1K-J-1/10

REPLACEMENT PARTS LIST

Models: CT-27SX10B, CT-27SX10CB & CT-F2910XB

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

REF NO.	PART NO.	DESCRIPTION
R6562	ERJ6GEYJ102	RES,M 1K-J-1/10
R6563	ERJ6ENF1131	RES,M 1.13K-F-1/10W
R6564	ERJ6ENF1780	RES,M 178-F-1/10
R6565	ERJ6GEYJ471	RES,M 470-J-1/10
R6566	ERJ6GEYJ102	RES,M 1K-J-1/10
R6567	ERJ6GEYJ101	RES,M 100-J-1/10
R6569	ERJ6GEYJ101	RES,M 100-J-1/10
R6570	ERJ6GEYJ103	RES,M 10K-J-1/10
R6571	ERJ6GEYJ123	RES,M 12K-J-1/10
R6572	ERJ6GEYJ101	RES,M 100-J-1/10
R6575	ERJ6GEYJ821	RES,M 820-J-1/10
R6576	ERJ6GEYJ102	RES,M 1K-J-1/10
SWITCHES		
S001	TSE2AD002	SWITCH, PUSH
S002	EVQPBD05R	SWITCH
S003	EVQPBD05R	SWITCH
S004	EVQPBD05R	SWITCH
S005	EVQPBD05R	SWITCH
S006	EVQPBD05R	SWITCH
S007	EVQPBD05R	SWITCH
TRANSFORMERS		
T001	**TLP16297**	**TRANSFORMER, POWER SUPPLY**
T501	ETH19Y70AY	TRANSFORMER, HORIZONTAL DRIVER
T551	**KFT4AA309F**	**TRANSFORMER, FLYBACK**
T801	**ETS39AG2M5NC**	**TRANSFORMER, SWITCHING**
CRYSTALS/FILTERS		
X301	TSS2AA001	CRYSTAL, 3.58MHZ
X302	TAFCSB503F30	CRYSTAL
X1101	TSSA092	CRYSTAL OSCILLATOR
OTHERS		
TNR001	**ENGE6101D**	**TUNER**
M001	EUR511502	REMOTE CONTROL
M002	UR51EC975A	BATTERY COVER
DY	KDY4UH986F1	YOKE, DEFLECTION

REF NO.	PART NO.	DESCRIPTION
M003	**M68LQK125X**	**CRT, 27"**
M004	TES2AA0021	COIL SPRING
M005	TSP2AF002	COIL, GEO MAGNETIC
M006	TBM2AC0321	OVERLAY
M007	TBM2A30843	PANASONIC BADGE
M008	TEK6940	DOOR CATCH
M009	TKK4G8533	LED PANEL
M010	TKP4G11460	SMOKED PANEL
M011	TKP4G11950	REAR A/V BRACKET
M012	TKP4G11490S	ASSY, CONTROL DOOR
M013	EABG12147B2	SPEAKER DOME
M014	TXFSPB03BSER	ASSY, SPEAKER BRACKET
M015	TXFKY37BSER	ASSY, CABINET FRONT *CT-27SX10B CT-27SX10CB*
M016	TXFKU58BSER	ASSY, CABINET BACK
M017	TXFKY40BSER	ASSY, CABINET FRONT *CT-F2910XB*
M018	TQB2AA0363	MANUAL, OWNERS *CT-27SX10B CT-F2910XB*
M019	TQB2AA0364	MANUAL, OWNERS *CT-27SX10CB*
M020	TQB2AA7058	REMOTE GUIDE
M021	TQB2AA7076	V-CHIP ROLLER GUIDE
DEG	**TSP2AA019**	**COIL, DEGAUSSING**
M022	**TXASX2710FHS**	**ASSY., LINE CORD**
M023	TXF3A01ZERA	ASSY., DAG GND
M024	0FMK014ZZ	CONVERGENCE CORRECTOR STRIP
M025	TXANV14BSER	EXT. CABLE KIT(25 pins)
M026	TXANV15BSER	EXT. CABLE KIT(8 & 6 pins)
JK3001	TJB2AA0271	TERMINAL, REAR A/V
JK3151	TJBA125	TERMINAL

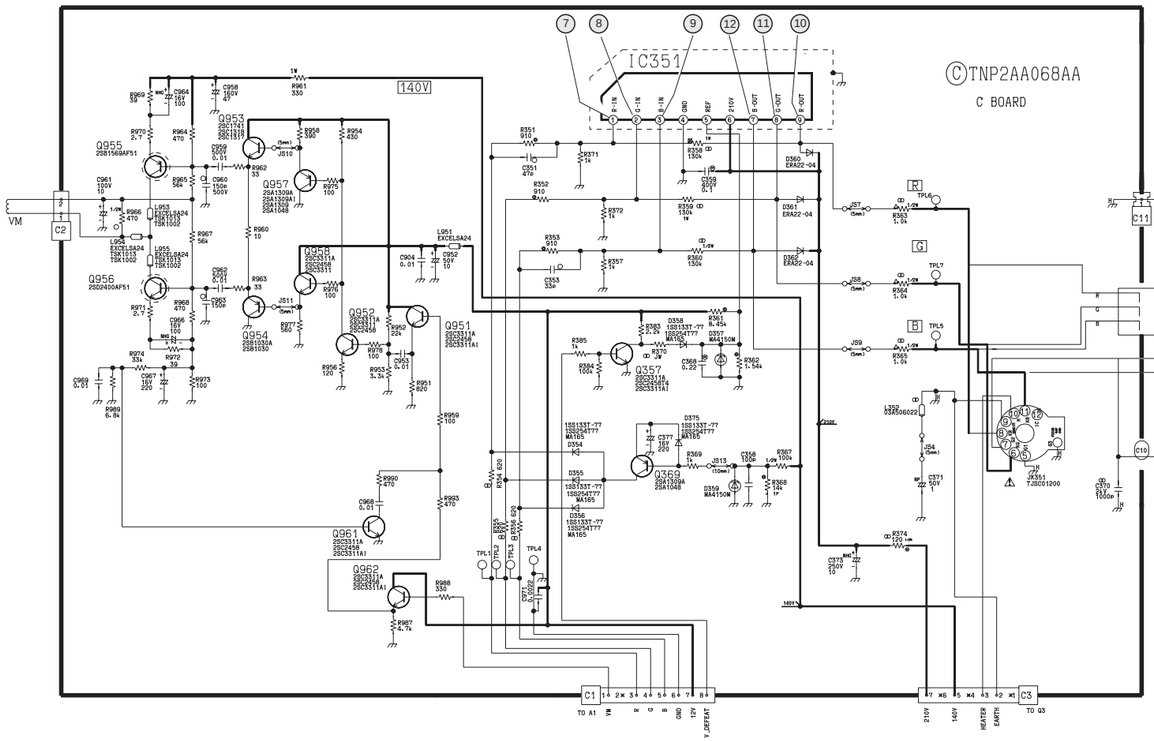
DESCRIPTION OF ABBREVIATIONS GUIDE

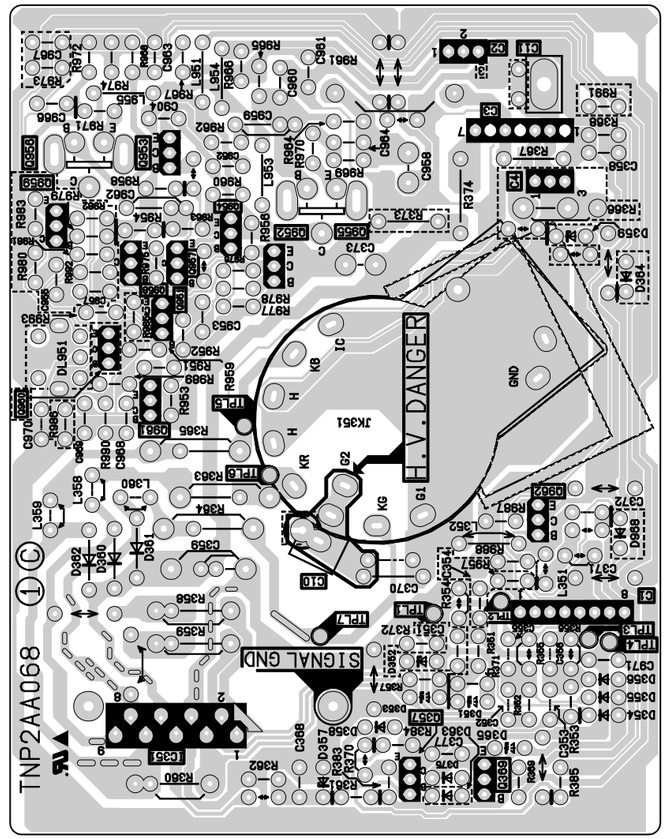
RESISTOR			
TYPE		TOLERANCE	
C	Carbon	F	± 1%
F	Fuse	J	± 5%
M	Metal Oxide	K	± 10%
S	Solid	M	± 20%
W	Wire Wound	G	± 2%

RES, C 270-J-1/4

CAPACITOR			
TYPE		TOLERANCE	
C	Ceramic	C	± 0.25pF
E	Electrolytic	D	± 0.5pF
P	Polyester	F	± 1pF
S	Styrol	J	± 5%
T	Tantalum	K	± 10%
		L	± 15%
		M	± 20%
		P	+10% -0%
		Z	+80% -20%

CAP, P .068UF-K-50V



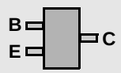


	Q357	Q369	Q951	Q952	Q953	Q954
E	0.69	14.83	6.79	1.48	9.51	8.18
B	0.00	0.00	11.90	8.86	11.90	GND
C	GND	14.63	6.14	0.84	8.98	8.82

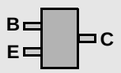
	Q955	Q956	Q957	Q958	Q961	Q962
E	137.3	0.93	8.86	8.85	0.00	1.48
B	69.8	69.9	GND	11.90	0.00	8.86
C	13.8	450.5	9.51	8.18	GND	0.84

IC 351
1 ..... 1.71
2 ..... 1.71
3 ..... 1.71
4 ..... GND
5 ..... 1.82
6 ... 220.00
7 ... 127.00
8 ... 131.00
9 ... 122.00

IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN *CHIP*



CHIP TRANSISTOR LEAD DESIGNATION



Nota:

La medición de los voltajes se hizo con un Voltímetro Digital.

Note:

Obtained voltages with a multimeter.

IMPORTANT SAFETY NOTICE

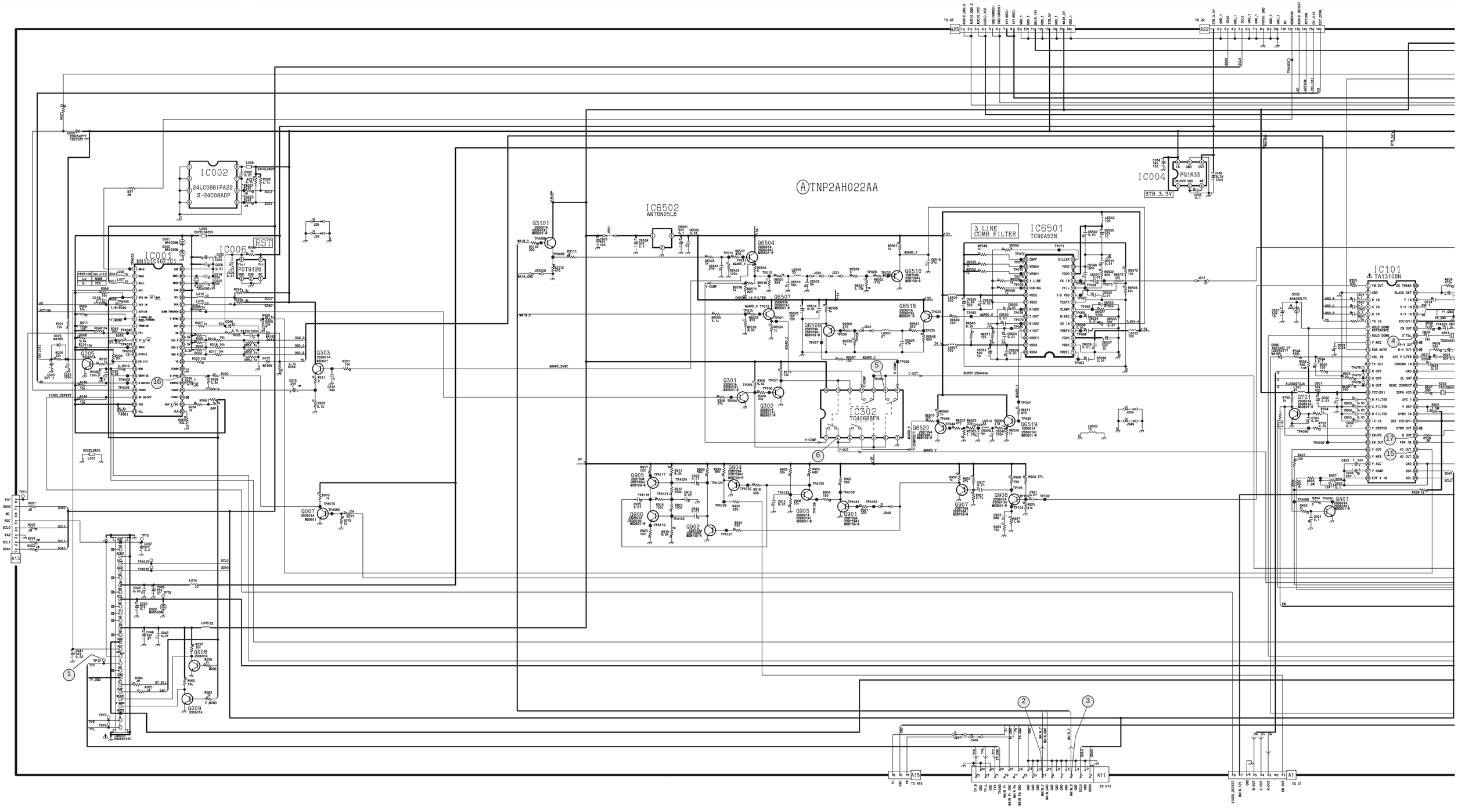
THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES THAT ARE IMPORTANT FOR PROTECTION FROM X-RADIATION, FIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS DESIGNATED WITH A ⚠ IN THE SCHEMATIC.

NOTA DE SEGURIDAD

LOS DIAGRAMAS ELÉCTRICOS INCLUYEN CARACTERÍSTICAS ESPECIALES MUY IMPORTANTES PARA LA PROTECCIÓN CONTRA RAYOS-X, QUEMADURAS Y DESCARGAS ELÉCTRICAS. CUANDO SE DE SERVICIO ES IMPORTANTE USAR PARA REEMPLAZO DE COMPONENTES CRITICOS, SOLO PARTES ESPECIFICADAS POR EL FABRICANTES. LOS COMPONENTES CRITICOS ESTAN SEÑALADOS EN LOS DIAGRAMAS POR EL SIMBOLO ⚠.

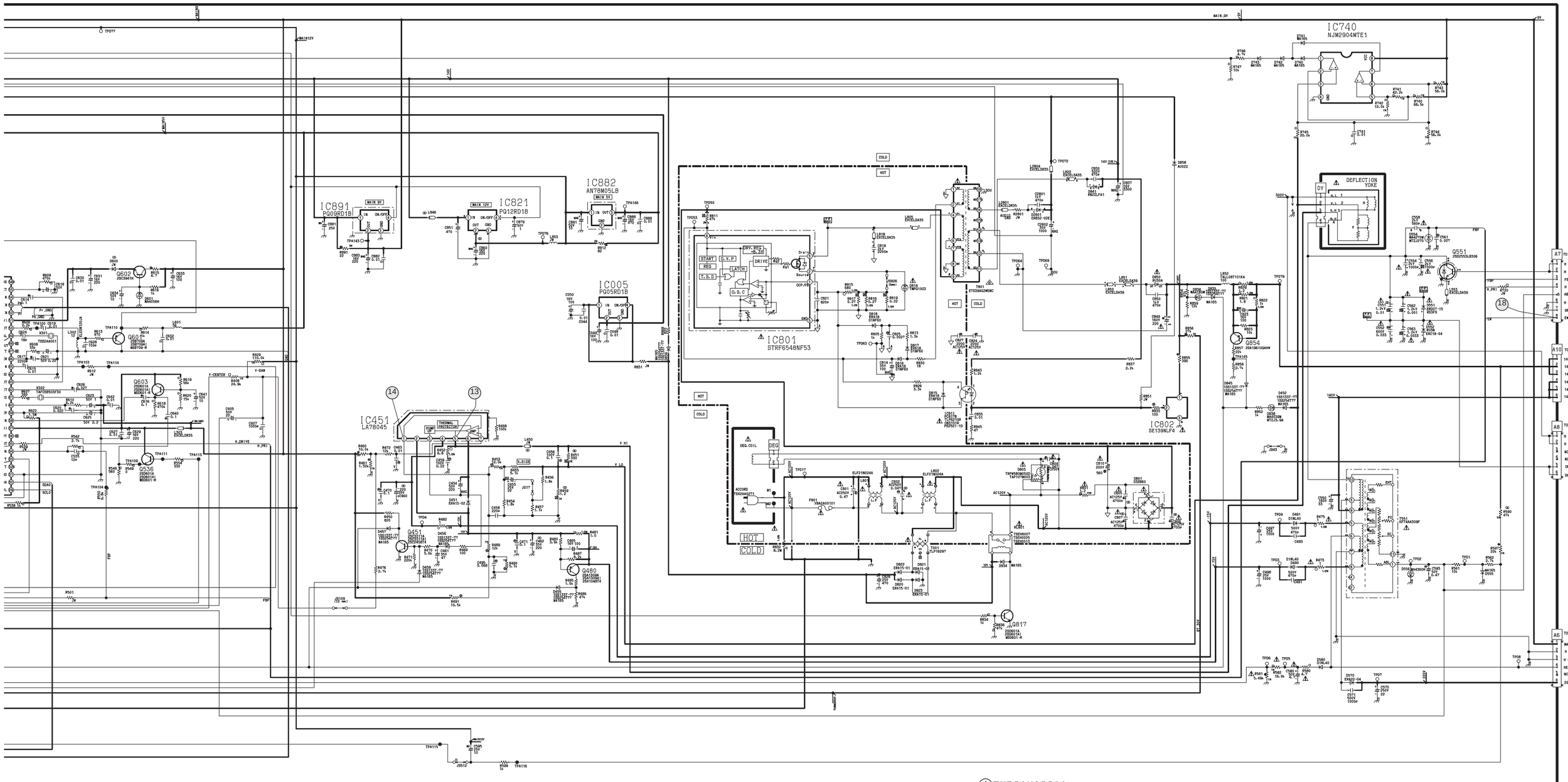
ALL MODELS

A-BOARD SCHEMATIC DIAGRAM, LEFT PORTION - DIAGRAMA ELECTRICO TARJETA A, SECCION IZQUIERDA



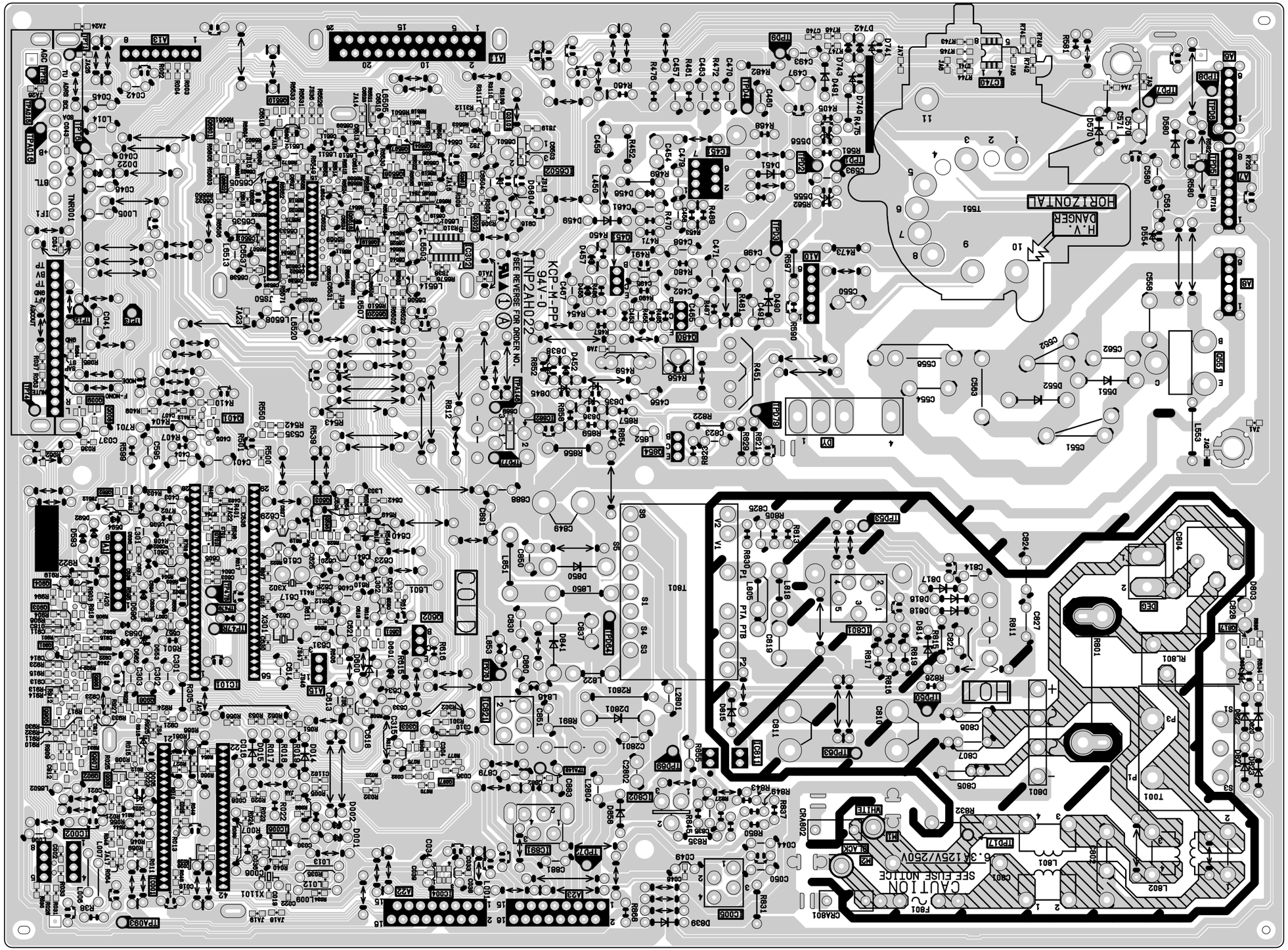
A-BOARD SCHEMATIC, RIGHT PORTION - DIAGRAMA ELECTRICO TARJETA A, SECCION DERECHA

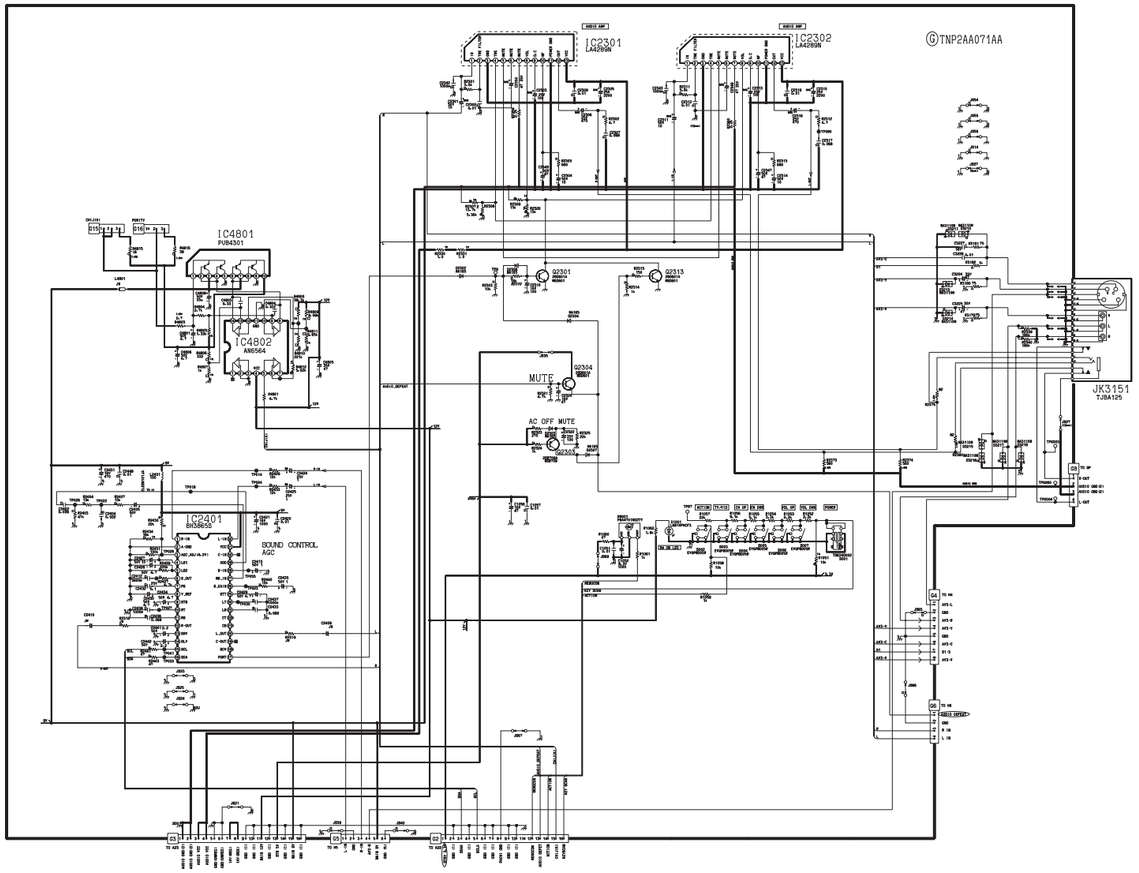
ALL MODELS



ALL MODELS

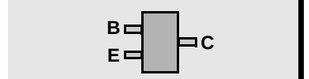
A BOARD LAYOUT - DIAGRAMA DE CIRCUITO IMPRESO TARJETA A



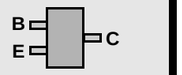


	Q2301	Q2303	Q2304
E	0.00	13.07	0.00
B	1.79	0.00	4.98
C	GND	12.23	0.00

IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN *CHIP*



CHIP TRANSISTOR LEAD DESIGNATION



Nota:

La medición de los voltajes se hizo con un Voltímetro Digital.

Note:

Obtained voltages with a digital multimeter.

IC2301	
1	4.19
2	4.19
3	GND
4	2.49
5	0.00
6	8.85
7	8.87
8	4.78
9	11.16
10	11.06
11	GND
12	11.12
13	24.11

IC2302	
1	4.19
2	4.19
3	GND
4	2.49
5	0.00
6	8.85
7	8.86
8	4.78
9	11.16
10	11.02
11	GND
12	11.08
13	24.11

IC2401			
1	4.36	17	0.00
2	GND	18	n.c
3	2.55	19	n.c
4	0.00	20	4..38
5	0.10	21	n.c
6	4.43	22	n.c
7	4.39	23	4.37
8	4.38	24	4.35
9	0.00	25	0.00
10	4.36	26	4.39
11	4.37	27	4.38
12	4.38	28	4.38
13	0.00	29	4.36
14	0.00	30	n.c
15	2.14	31	8.80
16	2.14	32	4.36

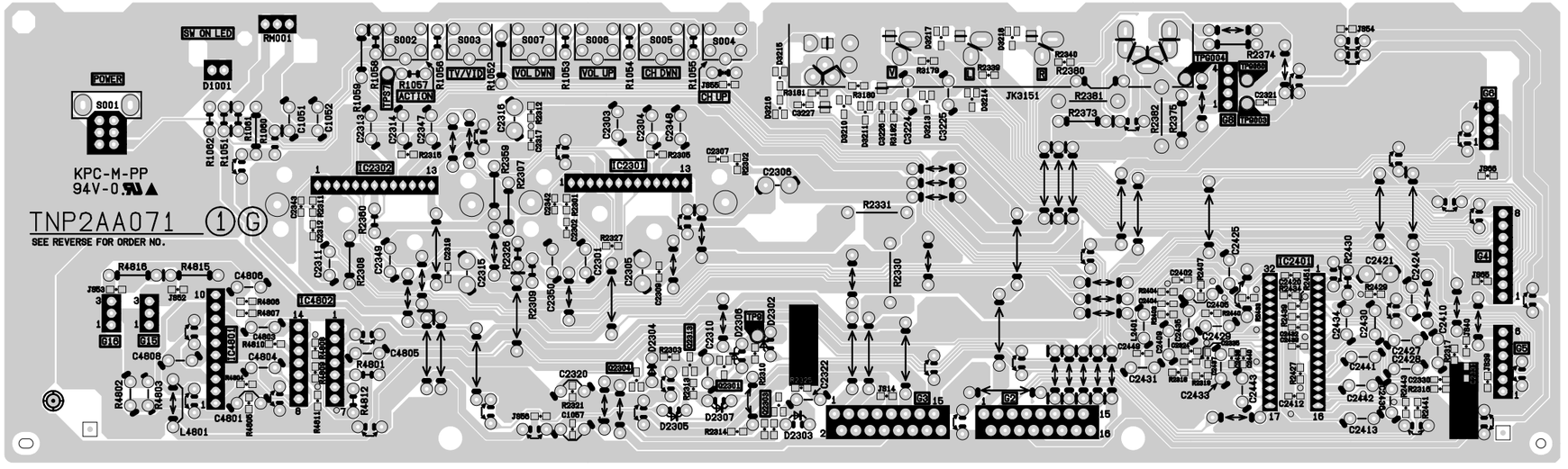
IC4802	
1	0.00
2	0.00
3	GND
4	11.90
5	0.72
6	10.68
7	10.68
8	0.71
9	6.37
10	5.01
11	GND
12	10.60
13	6.63
14	9.55

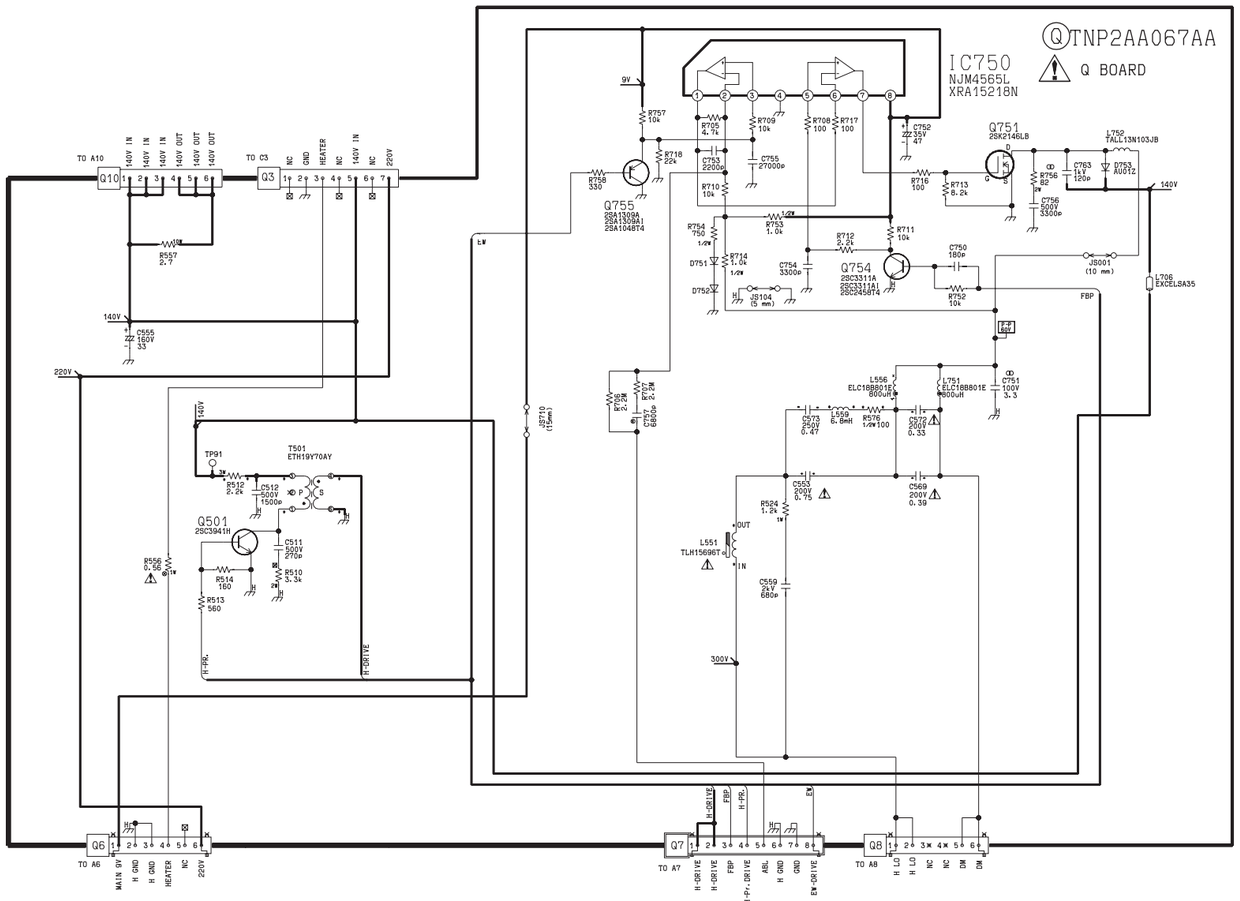
IC4801	
1	1.38
2	0.72
3	8.87
4	0.72
5	GND
6	9.56
7	8.87
8	9.55
9	GND
10	8.83

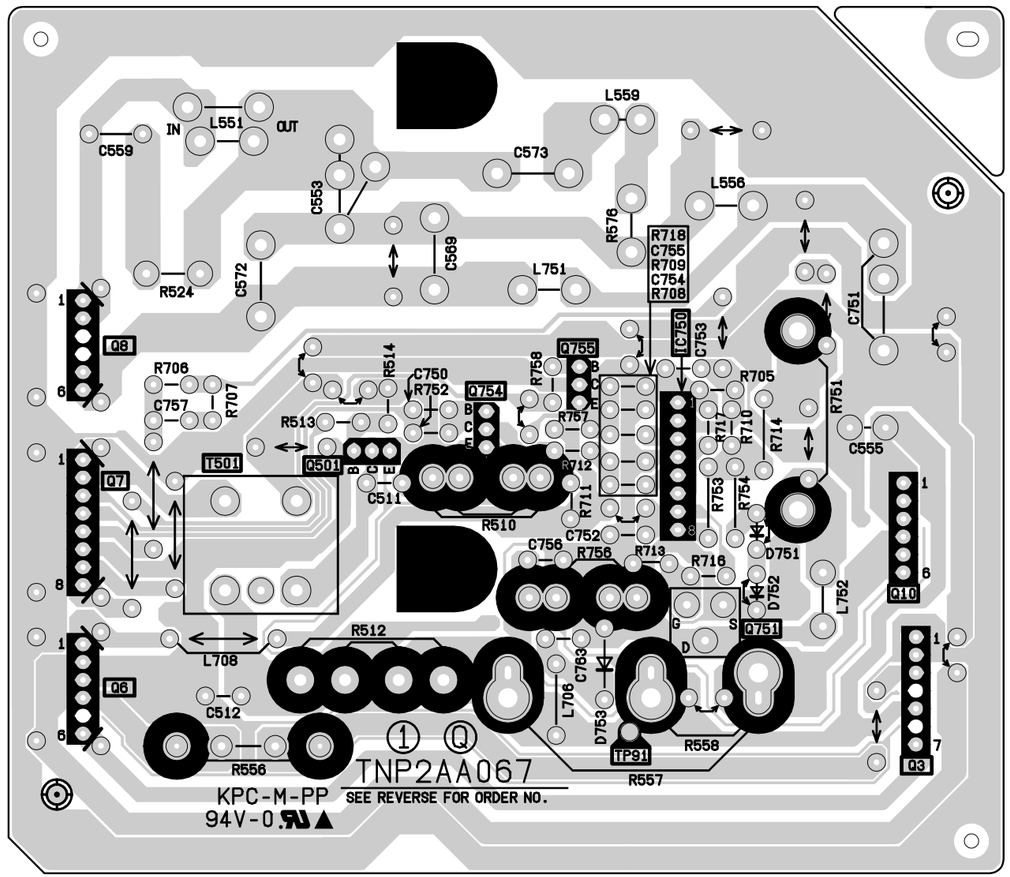
Schematic Notes

1. Resistors are carbon 1/4W unless noted otherwise.
2. Capacitors are ceramic 50V unless noted otherwise.
3. Coil value notes is inductance in µH.
4. Test point indicated by ; Test point but no pin .
5. Components indicated with ⚠ are critical parts and replacement should be made with manufacture specified replacement parts only.
6. ▬ (**BOLD LINE**) indicates the route of B+ supply.
7. The schematic diagrams are current at the time of printing and are subject to change without notice.
8. Ground symbol ⏚ indicates **HOT GROUND CONNECTION**; ⏚ indicates COLD GROUND.

NOTE: All other component symbols are used for engineering design purposes.



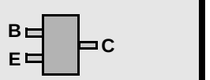




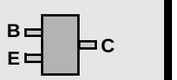
	Q501	Q751	Q754	Q755
E	0.00	6.69	0.00	4.27
B	80.00	20.44	4.70	GND
C	0.00	GND	GND	4.82

IC750	
1	3.03
2	4.85
3	4.84
4	GND
5	4.72
6	2.99
7	6.77
8	8.88

IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN *CHIP*



CHIP TRANSISTOR LEAD DESIGNATION



Nota:

La medición de los voltajes se hizo con un Voltímetro Digital.

Note:

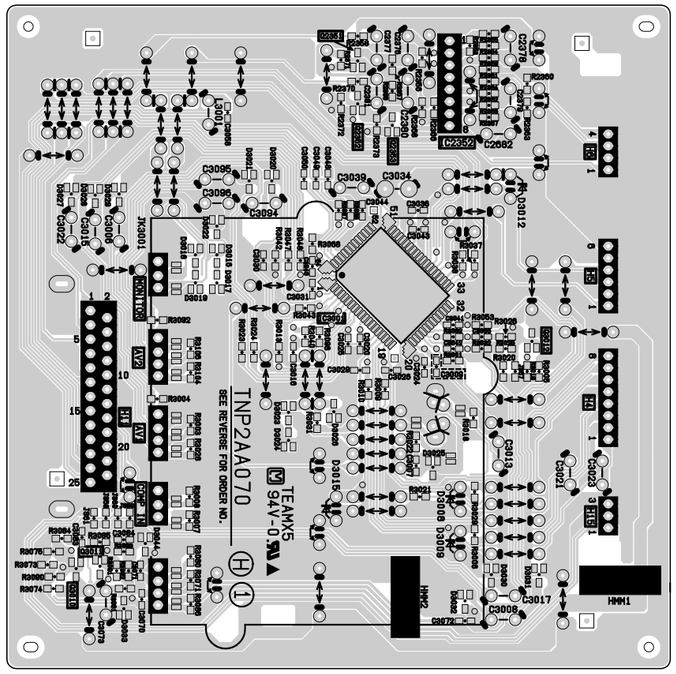
Obtained voltages with a digital multimeter.

IMPORTANT SAFETY NOTICE

THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES THAT ARE IMPORTANT FOR PROTECTION FROM X-RADIATION, FIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFACTURERS SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS DESIGNATED WITH A ⚠ IN THE SCHEMATIC.

NOTA DE SEGURIDAD

LOS DIAGRAMAS ELÉCTRICOS INCLUYEN CARACTERÍSTICAS ESPECIALES MUY IMPORTANTES PARA LA PROTECCIÓN CONTRA RAYOS-X, QUEMADURAS Y DESCARGAS ELÉCTRICAS. CUANDO SE DE SERVICIO ES IMPORTANTE USAR PARA REEMPLAZO DE COMPONENTES CRITICOS, SOLO PARTES ESPECIFICADAS POR EL FABRICANTES. LOS COMPONENTES CRITICOS ESTAN SEÑALADOS EN LOS DIAGRAMAS POR EL SIMBOLO ⚠.



	Q2351	Q2352	Q2353	Q3010	Q3011	Q3012
E	0.00	13.07	0.00	0.00	0.00	0.00
B	1.79	0.00	4.98	4.98	4.98	4.98
C	GND	12.23	0.00	0.00	0.00	0.00

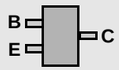
Nota:

La medición de los voltajes se hizo con un Voltímetro Digital.

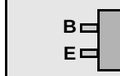
Note:

Obtained voltages with a digital multimeter.

IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN *CHIP*



CHIP TRANSISTOR LEAD DESIGNATION



IC2352			
1	5.54		
2	5.55		
3	5.51		
4	GND		
5	5.89		
6	5.79		
7	5.80		
8	8.89		

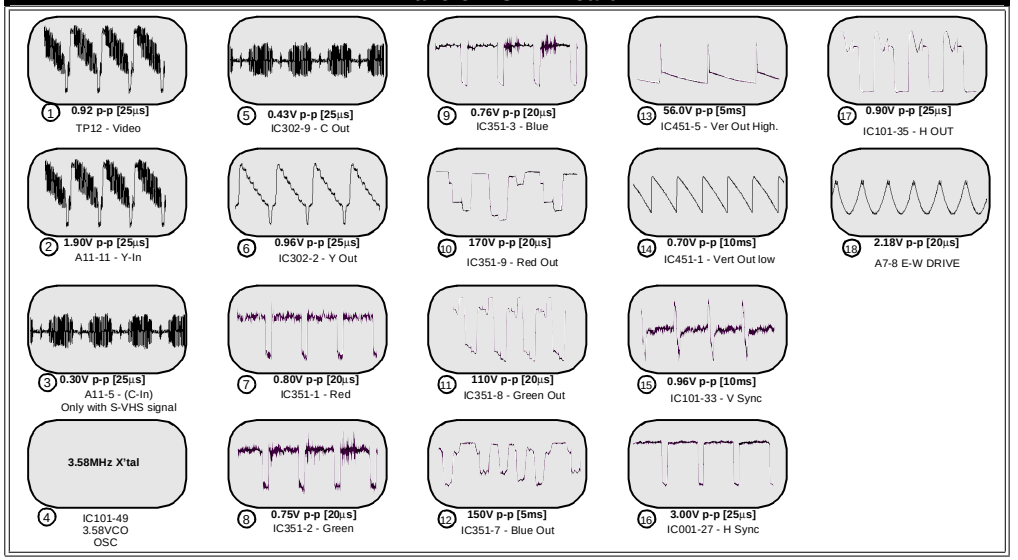
IC3001			
1	3.80	33	3.64
2	4.42	34	3.55
3	3.92	35	0.00
4	4.43	36	n.c
5	4.39	37	4.29
6	0.00	38	4.46
7	4.89	39	4.72
8	3.92	40	4.46
9	4.39	41	4.98
10	n.c	42	8.89
11	4.40	43	n.c
12	n.c	44	GND
13	n.c	45	5.45
14	n.c	46	n.c
15	3.93	47	n.c
16	4.39	48	GND
17	3.84	49	n.c
18	4.41	50	4.45
19	4.37	51	n.c
20	0.10	52	n.c
21	4.86	53	n.c
22	n.c	54	n.c
23	4.43	55	n.c
24	3.94	56	n.c
25	4.43	57	GND
26	n.c	58	n.c
27	n.c	59	n.c
28	GND	60	n.c
29	n.c	61	n.c
30	n.c	62	4.43
31	n.c	63	4.61
32	GND.	64	4.43

Voltage Measurements

1. Voltage measurement:
   - AC input to the Receiver is 120V. NTSC (HD, 1125i & 525P when applicable) signal generator is connected to the antenna of the Receiver. (Color bar pattern of 100 IRE white and 7.5 IRE black.)
   - All Picture and Audio adjustments are set to Normalize.
     TV ANT/CABLE - (Set-Up Menu) in TV/ANT Mode
     Volume - Min.
     TV/Video SW - TV position
     Audio Mode - Stereo
   - Voltage readings are nominal and may vary ±10% on active devices. Some voltage reading will vary with signal strength and picture content.
   - Supply voltages are nominal.
2. Ground symbol ⏚ indicates ground lead connection of meter. Incorrect ground connection will result in erroneous readings.

CAUTION: ***Incorrect ground connection of the test equipment will result in erroneous readings.***

Waveforms - A-Board



NOTE: Waveforms 7 to 12 are in C-Board.

	Q004	Q005	Q007	Q008	Q009	Q301	Q302
E	3.29	0.32	0.00	0.74	0.74	0.00	0.64
B	0.00	1.19	3.44	0.00	0.00	7.70	0.00
C	3.29	GND	GND	GND	GND	GND	GND

	Q303	Q401	Q451	Q480	Q530	Q531	Q532
E	2.49	0.65	0.71	15.63	11.23	11.91	0.00
B	4.48	5.11	0.00	0.00	11.82	0.00	0.00
C	1.86	GND	GND	15.86	11.89	10.21	0.00

	Q536	Q551	Q601	Q602	Q603	Q701	Q817
E	2.63	0.00	0.00	5.74	1.88	0.62	0.74
B	8.86	-44.88	0.00	8.64	8.89	4.27	0.00
C	1.99	GND	0.68	5.02	1.70	GND	GND

	Q854	Q901	Q902	Q903	Q904	Q905	Q906
E	0.14	1.27	1.27	3.06	6.91	8.54	0.33
B	0.00	GND	GND	6.90	GND	4.35	4.36
C	139.70	1.98	1.96	2.42	7.36	8.84	0.00

	Q907	Q908	Q3101	Q6504	Q6507	Q6508	Q6510
E	0.74	4.2	3.89	3.18	2.64	1.72	1.95
B	0.00	7.22	8.88	4.98	9.98	0.00	GND
C	GND	GND	2.34	2.52	2.00	2.38	2.62

	Q6518	Q6519	Q6520
E	3.93	3.53	1.99
B	4.98	4.98	GND
C	3.26	2.86	2.64

IC 001

1	3.23	22	2.04
2	4.97	23	3.29
3	4.97	24	n.c
4	1.59	25	1.41
5	2.84	26	2.44
6	3.29	27	2.64
7	3.29	28	GND
8	2.85	29	0.00
9	3.29	30	0.11
10	3.29	31	0.11
11	0.20	32	0.11
12	3.29	33	0.00
13	1.65	34	0.00
14	0.42	35	2.54
15	0.00	36	3.74
16	0.00	37	3.40
17	3.15	38	3.60
18	3.06	39	3.29
19	0.92	40	1.59
20	3.29	41	1.59
21	1.47	42	0.00

IC 002

1	GND
2	GND
3	GND
4	GND
5	4.97
6	4.97
7	GND
8	4.98

IC 004

1	4.98
2	GND
3	1.25
4	3.29
5	GND
6	4.98

IC 005

1	9.13
2	4.98
3	GND
4	9.05

IC 006

1	GND
2	GND
3	GND
4	3.29
5	3.29

IC 451

1	1.34
2	15.55
3	-13.79
4	-15.55
5	8.71AC
6	15.61
7	1.34

IC 101

1	4.15	29	3.60
2	GND	30	3.50
3	3.34	31	GND
4	3.33	32	n.c
5	3.32	33	2.74
6	0.00	34	1.10
7	6.00	35	0.48
8	5.27	36	n.c
9	5.16	37	8.89
10	0.00	38	3.00
11	5.91	39	6.21
12	n.c	40	7.44
13	2.62	41	5.90
14	2.46	42	5.00
15	2.50	43	1.00
16	8.76	44	0.00
17	5.09	45	1.82
18	4.92	46	1.44
19	4.878	47	n.c
20	2.54	48	n.c
21	3.07	49	3.97
22	4.27	50	3.40
23	0.64	51	5.02
24	0.66	52	3.07
25	5.11	53	3.10
26	2.05	54	3.75
27	4.30	55	2.49
28	5.07	56	n.c

IC 302

1	1.39
2	2.63
3	2.63
4	2.64
5	7.69
6	7.69
7	GND
8	2.38
9	2.38
10	2.38
11	2.01
12	0.00
13	0.00
14	8.88

IC 740

1	0.00
2	3.96
3	1.83
4	GND
5	0.87
6	1.83
7	0.00
8	8.88

IC 801

1	1.34
2	0.10
3	4.30AC
4	16.25
5	0.00

IC 802

1	0.13
2	10.09
3	GND

IC 821

1	13.13
2	11.92
3	GND
4	1.90

IC 882

1	11.92
2	GND
3	4.99

IC 891

1	13.13
2	8.91
3	GND
4	1.90

IC 6502

1	8.88
2	GND
3	4.98

IC 811

1	11.15
2	10.14
3	1.24
4	14.92

IC 6501

1	1.47	15	4.85
2	GND	16	4.85
3	4.91	17	4.85
4	3.44	18	0.00
5	2.07	19	0.00
6	1.42	20	4.90
7	3.20	21	0.00
8	0.00	22	3.49
9	2.44	23	3.93
10	1.71	24	1.68
11	2.19	25	3.54
12	4.97	26	3.94
13	0.00	27	4.94
14	0.00	28	0.00

CHIP TRANSISTOR LEAD DESIGNATION

IDENTIFICACIÓN DE TERMINALES PARA TRANSISTORES EN *CHIP*

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